AGENDA

Thursday, September 10, 2020
(Please note change)
6:00 PM
Prior Lake City Hall
www.plslwd.org

BOARD OF MANAGERS:
Mike Myser, President; Curt Hennes, Vice President; Bruce Loney, Treasurer;
Steve Pany, Secretary and Frank Boyles, Manager

Note: Indicated times are estimates; actual times may vary considerably. Individuals with items on the agenda or who wish to speak to the Board are encouraged to be in attendance when the meeting is called to order.

Board Workshop 4:00 PM – Council Chambers (Please note change)

- 2021 Draft Budget
- Upper Watershed Blueprint Update
- District Bank Relationship
- Updates: FEMA, Sutton Lake Project and Financial Services

6:00 – 6:10 PM 1.0 **BOARD MEETING CALL TO ORDER & PLEDGE OF ALLEGIANCE**

6:10 – 6:15 PM 2.0 **PUBLIC COMMENT**
If anyone wishes to address the Board of Managers on an item not on the agenda or on the consent agenda please come forward at this time, turn on the microphone and state your name and address. (The Chair may limit your time for commenting.)

6:15 – 6:20 PM 3.0 **APPROVAL OF AGENDA** (Additions/Corrections/Deletions)

PUBLIC HEARING 2020 PRELIMINARY LEVY

- 2021 Levy—Resolution 20-343 (Vote)

6:20-7:15 PM 4.0 **OTHER OLD/NEW BUSINESS**

4.1 Programs & Projects Update (Discussion Only)
  - Water Quality, Water Storage and AIS Inspections

4.2 IPM Plan Update (Maggie Karschnia and Tony Havranek, WSB) (Discussion Only)
4.3 Pickleball Court Permit 20-01 (Maggie Karschnia and Carl Almer) (Vote)
4.4 Pike Lake Culvert Permit 20-02 (Pete Young) (Vote)
4.5 New CAC Member Application-Ben Burnett (Kathryn Keller-Miller) (Vote)

7:15-7:30 PM 5.0 **CONSENT AGENDA**
The consent agenda is considered as one item of business. It consists of routine administrative items or items not requiring discussion. Items can be removed from the consent agenda at the request of the Board member, staff member, or a member of the audience. Please state which item or items you wish to remove for separate discussion.

5.1 Meeting Minutes – August 13 Workshop and Board Meeting
5.2 Meeting Minutes—August 27 CAC Meeting
5.3 Claims List

7:30-7:45 PM 6.0 **TREASURER'S REPORT**

6.1 Cash & Investments (Discussion Only)

6.2 Financial Report (Discussion Only)

7:45-7:50 PM 7.0 Manager Presentations on Watershed-related Items (Discussion Only)

7:50-7:55 PM 8.0 **UPCOMING MEETING/EVENT SCHEDULE:**

- CAC MEETING, CITY HALL, THURSDAY, SEPTEMBER 24, 2020

PRIOR LAKE - SPRING LAKE
WATERSHED DISTRICT

Resolution 20-343

Certifying the 2021
Administrative and Metropolitan Water Management Tax Levy

WHEREAS the Prior Lake-Spring Lake Watershed District (PLSLWD) is a watershed management organization and political subdivision of the State of Minnesota established under and operating with powers and purposes set forth at Minnesota Statutes Chapters 103B and 103D;

WHEREAS the PLSLWD has an approved watershed management plan under Minnesota Statutes Section 103B.231;

WHEREAS Minnesota Statute Section 103D.905, subdivision 3, authorizes the PLSLWD to levy an *ad valorem* tax on real property within the PLSLWD for the administrative expenses of the District not to exceed $250,000.00;

WHEREAS Minnesota Statutes Section 103B.241, subdivision 1, authorizes the PLSLWD to levy an *ad valorem* tax on real property within the PLSLWD sufficient to pay the increased costs to the PLSLWD to prepare and implement its watershed management plan;

THEREFORE, BE IT RESOLVED that in accordance with Minnesota Statutes Section 103D.915, the Board hereby approves and certifies to the Scott County Auditor an *ad valorem* levy in the total amount of $1,794,632 to be levied on all taxable property within the PLSLWD, composed of the following:

- $ 166,126 for the General Fund under authority of Minnesota Statutes Section 103D.905, subdivision 3;
- $ 1,628,506 to implement the watershed management plan under Minnesota Statutes Section 103B.241, for general projects and programs of the PLSLWD.

The question was on the adoption of the Resolution and there were __ yeas and __ nays as follows:

	Yea	Nay	Absent
BOYLES			
HENNES			
LONEY			
MYSER			
PANY			

Upon vote, the chair declared the resolution adopted.

_____ Dated: _____, 2020
Steve Pany, Secretary

PRIOR LAKE SPRING LAKE WATERSHED DISTRICT

SEPTEMBER 2020 PROGRAMS AND PROJECTS UPDATE

PROGRAM OR PROJECT	LAST MONTH'S STAFF ACTIVITIES	NEXT STEPS
Storage & Infiltration Projects (Sutton Lake) *Project Lead: Diane*	• District Attorney is working with MMB on easement language • Provide drafts of easements to property owners	• Once the MMB approves of the easements, secure signatures on easements
Carp Management ***Rough Fish Management (Class 611)*** ***Carp Management Project (Class 750 & 751)*** *Project Lead: Maggie*	• **Tracking:** Continued to track radio-tagged and PIT-tagged carp across Spring and Prior Lakes and connecting waterbodies. • **Baited Box Traps:** Three box traps have been deployed: two are currently on Spring Lake, one by the Spring Lake Parcel and one by Spring Lake Regional Park; and one is on Upper Prior Lake to the southwest of the boat launch. Volunteers and staff have been checking on the sites and re-filling the bait bags as needed. On 7/30 and 8/12 when a large group of carp were regularly visiting the site, the trap was sprung and the carp were removed and taken to the Hentges farm for compost. To date, there have been 626 carp removed using the baited box traps totaling roughly 3,000 pounds. • **Carp Volunteer Projects.** The PLSLWD has solicited volunteer help with carp tracking, baiting, and training. • **Geis Wetland Removals.** Carp were removed through electrofishing efforts on 8/19. Stocked bluegills were observed from last spring. • **FeCl Weir Barrier.** The installation of the new carp barrier and walkway is complete. • **MPCA 319 Project Tour.** Mark Hanson, the MPCA 319 grant administrator, toured the site with staff on September 1st. • **IPM Plan Update.** Staff worked with WSB to update the IPM Plan.	• WSB and PLSLWD staff will continue to track the tagged carp. • Ensure vegetation establishment at the FeCl weir project site. • Work with WSB to schedule and coordinate upcoming carp removals as opportunities arise for both electrofishing and micro-haul events. • Continue to monitor, update, and remove carp from the baited box traps. • Coordinate citizen-assisted volunteer projects, including Training the Carp program. • Present the draft 2020 IPM Plan update at the September Board Meeting.

SEPTEMBER 2020 PROGRAMS AND PROJECTS UPDATE

PROGRAM OR PROJECT	LAST MONTH'S STAFF ACTIVITIES	NEXT STEPS
Public Infrastructure Partnership Projects *Project Lead: Maggie & Diane*	• Drafted 2021 budget	• Board review
Ferric Chloride System Operations *Project Lead: Jaime*	• Installed permanent carp barrier structure and walkway • Monthly Discharge Monitoring Report • Samples taken weekly and inspected facility an additional 2x/week	• Approve new NDPES permit • Monthly Discharge Monitoring Report • Sample weekly and inspect facility 2x/week
Farmer-Led Council *Project Lead: Maggie*	• Cover crop sign-ups are complete and seeding is getting scheduled.	• Potential cover crop tour this fall. • Explore farmer mentorship program with FLC. • Outreach to researchers and investigate possible grants for a 2021 farming research project. • Next FLC meeting in December.
Cost Share Incentives *Project Lead: Kathryn, Diane*	• Respond to cost-share requests and questions as received.	• Respond to cost-share requests and questions as received.
Spring Lake Parcel Restoration Project *Project Lead: Maggie & Kathryn*	• AES will be performing vegetation maintenance on the parcel, removing buckthorn re-sprouts and treating other invasive vegetation.	• Monitor restoration and control invasive species during growing season • Install small plant identification signs
Raymond Park Restoration Project *Project Lead: Kathryn*	• Developing interpretative signs for project.	• Install educational interpretative signs • Host ribbon-cutting event later this year to highlight restoration
Fish Lake Shoreline & Prairie Restoration Project *Project Lead: Kathryn*	• MN Native Landscapes (MNL) performing vegetation maintenance. • Project is one of the sites highlighted by the Hike the Watershed Challenge.	• MN Native Landscapes is conducting restoration maintenance/establishment work
CR 12/17 Wetland Restoration *Project Lead: Maggie*	• No new activity.	• Meet with the County & City on-site for another effort to trouble-shoot outlet structure issues. • Officially hand over vegetation maintenance of project to City of Prior Lake.

SEPTEMBER 2020 PROGRAMS AND PROJECTS UPDATE

PROGRAM OR PROJECT	LAST MONTH'S STAFF ACTIVITIES	NEXT STEPS
Lower Prior Lake Retrofit Projects *Project Lead: Maggie*	• No new activity.	• Continue to work with MNL on site maintenance until the projects are fully established and accepted by the City of Prior Lake • Install interpretive signs for projects
District Plan Update *Project Lead: Diane*	• Reviewed prototype Plan	• Print copies and distribute, as needed
Feasibility Reports *Project Lead: Maggie*	• No new activity.	• Conduct in-person meeting with farmer and landowner for the Spring Lake West subwatershed project when COVID-19 restrictions are lifted. • Coordinate remote meeting with MnDOT and City of Savage to discuss options for Lower Prior Lake subwatershed project.
Website and Media *Project Lead: Kathryn*	• **Website articles posted:** New carp barrier installed at ferric site; Hike the Watershed featured by local newspapers. • **Prior Lake Am:** Hike the Watershed article published • **SCENE:** Submitted articles on Hike the Watershed for Oct/Nov edition • **Facebook & Twitter**- normal posting, carp, Hike the Watershed, native plant garden photos posts received attention.	• Continue writing posts and updates about projects • Will tweet and/or update Facebook about projects & news • Write article for next SCENE edition
Citizen Advisory Committee *Project Lead: Diane & Kathryn*	• August meeting held in person at City Hall with social distancing & masks • Subcommittees researching topics – research continuing on interactive AIS signage used at some boat launches. • Coordinate subcommittee work	• Subcommittees continue research, present findings to Board.
MS4 Education Program *Project Lead: Kathryn*	• Planning events and activities for District anniversary. Hike the Watershed challenge is ongoing and highlights District projects and area lakes & encourages people to get out and explore the District.	• Implement education activities • Plan anniversary events and activities
Monitoring Program *Project Lead: Jaime*	• Supervise AIS boat inspections • Monitor stream and lake chemistry • Took flow measurements • Download level loggers	• Sample streams biweekly • Take flow measurements • Data entry

SEPTEMBER 2020 PROGRAMS AND PROJECTS UPDATE

PROGRAM OR PROJECT	LAST MONTH'S STAFF ACTIVITIES	NEXT STEPS
Aquatic Vegetation Management and Surveys *(Class 626 and 637)* *Project Lead: Jaime*	• Mapped vegetation on Upper Prior, Jeffers, Fish, Spring, Lower Prior, Crystal • Received payment from Scott County for CLP treatment	• Finish summer plant surveys
BMPs & Easements *Project Lead: Maggie & Kathryn*	• Continued to work with landowners to resolve existing violation issues on their properties. Met with several landowners. • Easement inspections completed. • Responded to landowner questions and met with several landowners. • Completed several baseline documents.	• Review amendment requests as they are received and work with landowners towards closing out approved amendment requests • Work with landowners to resolve easement violations • Complete baseline documentation for each conservation easement property • Send post-inspection letters for completed inspections
Permitting *Project Lead: Maggie & Jeff*	• Completed inspections on permit sites and followed up with permittees. • Met with MnDOT onsite and discussed outstanding ESC issues at the #18.05 permit at the Highway 13 project site. • EOR provided review on upcoming development projects, including Parkhaven development. • Solicited and received four request to close out old permits. • Received and reviewed three permit requests.	• Present permit projects for review a the September Board Meeting. • Continue to inspect, follow-up on and close remaining open permits.
Rules Revisions *Project Lead: Diane*	• No activity	• Invite a subgroup from the TAC to review rule revisions • Present the revisions at an upcoming Board meeting for final approval
Outlet Channel O&M *Project Lead: Jaime*	• Few channel inspections now that lake is not outletting • Management of woody and herbaceous vegetation along the channel • Rock dams in channel removed	• Weekly channel inspections • Continue invasive plant management in channel • Install cameras at structure
Outlet Channel Bank Erosion (FEMA) *Project Lead: Diane*	• Revised Closeout on Trees and Sediment Delta sent to FEMA by HSEM	• Bank Erosion project closeout • Monitor warranty work of contractor
Outlet Channel Admin *Project Lead: Diane & Jaime*	• Finalize budget and work plan for 2021	• Cooperators meeting in Sept to finalize budget and work plan

PLSLWD Board Staff Report
Thursday, September 10

Subject |	2020 IPM Plan for Common Carp		
Board Meeting Date |	September 10, 2020	**Item No**	4.2
Prepared By |	Maggie Karschnia, Water Resources Project Manager		
Attachments	2020 IPM Plan for Common Carp: *draft document*		
Proposed Motion	PLSLWD staff is requesting one of the following three actions: 1) The Board make a motion to approve the 2020 IPM Plan for Common Carp as written. 2) The Board make a motion to approve the 2020 IPM Plan for Common Carp with minor revisions as identified. 3) The Board direct staff to make substantial changes to the plan which will be updated and brought to the Board for approval at its October meeting.		

BACKGROUND

With the understanding that common carp play a role in the decline of water quality within the Prior Lake Spring Lake Watershed, the Board first approved the District's Integrated Pest Management (IPM) Plan for Common Carp on May 9, 2017 which was subsequently updated on May 8, 2018. The IPM Plan supports the District's water quality goals established for individual waterbodies throughout the watershed, as well as the goals of the 2011 Upper Prior and Spring lake TMDL.

The IPM Plan is intended to be a living document, using adaptive management that may develop new management strategies and plan goals through data collection and analysis. As new information and techniques are acquired, current approaches, data collection efforts, and prioritization may change. The IPM plan should be reviewed annually to provide updates to identified goals and action items and potentially add or modify goals as data collection may dictates.

DISCUSSION

The IPM Plan for Common Carp has been developed as a guidance document for the management of common carp populations within the Prior Lake Spring Lake Watershed. With the 2020 annual update to the IPM Plan, District staff received initial comments and feedback from the Board of Managers on proposed carp management methods and cost-effectiveness of the overall program over time at its June meeting. The success and cost-effectiveness of the individual removal methods were discussed at the August meeting and PLSLWD staff received feedback from Board Managers on what components they would like to see included in the 2020 IPM Plan update. Those comments have been incorporated to the attached latest draft for Board review.

RECOMMENDATION

Staff Recommendation:

District staff recommends that if the Board is satisfied with the IPM Plan that it make a motion to approve it as long as it meets the following needs:

- Provides sufficient information on the status of carp in the watershed.
- Identifies all preferred tools available for carp management.
- Is a useful tool to Board and staff for making carp management decisions.

Action Required:

PLSLWD staff is requesting one of the following three actions from the Board of Managers:

1) The Board make a motion to approve the 2020 IPM Plan for Common Carp as written.
2) The Board make a motion to approve the 2020 IPM Plan for Common Carp with minor revisions as identified.
3) The Board direct staff to make substantial changes to the plan which will be updated and brought to the Board for approval at its October meeting.

PRIOR LAKE SPRING LAKE WATERSHED DISTRICT 50 YEARS

2020 Integrated Pest Management Plan (IPM Plan)

FOR COMMON CARP

PREPARED BY:
Tony Havranek, Senior Environmental Scientist, WSB
Mary Newman, Environmental Scientist, WSB
Maggie Karschnia, Project Manager, PLSLWD

wsb

Integrated Pest Management Plan (IPM)
For Common Carp

Updated and approved by the PLSLWD Board of Managers on:

_____, 2020

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PART 1 - EXECUTIVE SUMMARY

1.1 BACKGROUND

Common carp (*Cyprinus carpio*), a non-native fish originating in the Caspian region of Eurasia, are the most widely distributed nuisance fish in the United States (Nico et al., 2012). Carp can have direct and indirect negative effects on water quality by uprooting submergent and emergent aquatic vegetation and by releasing phosphorous sequestered in lake sediments. The phosphorus is then available to free floating algae and can lead to an increase in total phosphorous and Chlorophyll-a concentrations in the lake and to a decrease in water clarity. By removing the carp from the system, both the phosphorus within the carp carcass and the amount that would typically be excreted will be completely removed, while also abating the release of phosphorus created by foraging behavior.

1.2 PRIORITY CARP MANAGEMENT LAKES

Spring Lake, Upper Prior Lake, and Pike Lake are listed on the MPCA's impaired waters list due to excess nutrients, and the TMDLs identify internal loading from rough, benthic fish, such as common carp, as one of its main contributors. These impairments limit recreational opportunities as well as waterfowl habitat, native aquatic vegetation abundance, and native game fish populations. As most of the waterbodies within the PLSLWD are connected, improvements to the impaired waters will also have benefits downstream.

As they are listed as Tier 1 Lakes in the PLSLWD's 2020-2030 Water Resources Management Plan, receive the highest public use, and are currently on the *state's impaired waters list,* the District has established the following two lakes as its **top carp management priority:**

Table 1. Summary of Top Carp Management Priority Lakes

	Carp Biomass Estimate (kg/ha)	Phosphorus Loading Rate (lbs/year)	Estimated Total Weight (lbs)	Reduction Needed to achieve 30 kg/ha (lbs)
Upper Prior Lake	**250.4 ± 79.1**	**1,431**	**87,441**	**76,939**
Spring Lake	**242.1 kg/ha ± 50.0**	**1,220**	**128,114**	**112,238**

Note that while Upper Prior and Spring Lakes are top priority lakes, the PLSLWD is tracking the other six connected chain-of-lakes as they are part of the whole system that the common carp population uses. Understanding the dynamics of the entire watershed system is the key component to successful long-term management of carp.

Secondary Priority Lakes. The PLSLWD also partners with SMSC in tracking carp on Arctic and Pike Lakes. SMSC is the lead partner on these two waterbodies and has completed removals on Arctic Lake with plans to remove carp on Pike Lake by the end of 2021. PLSLWD is assisting and complementing SMSC efforts with its carp program and plays only a supportive role at this time.

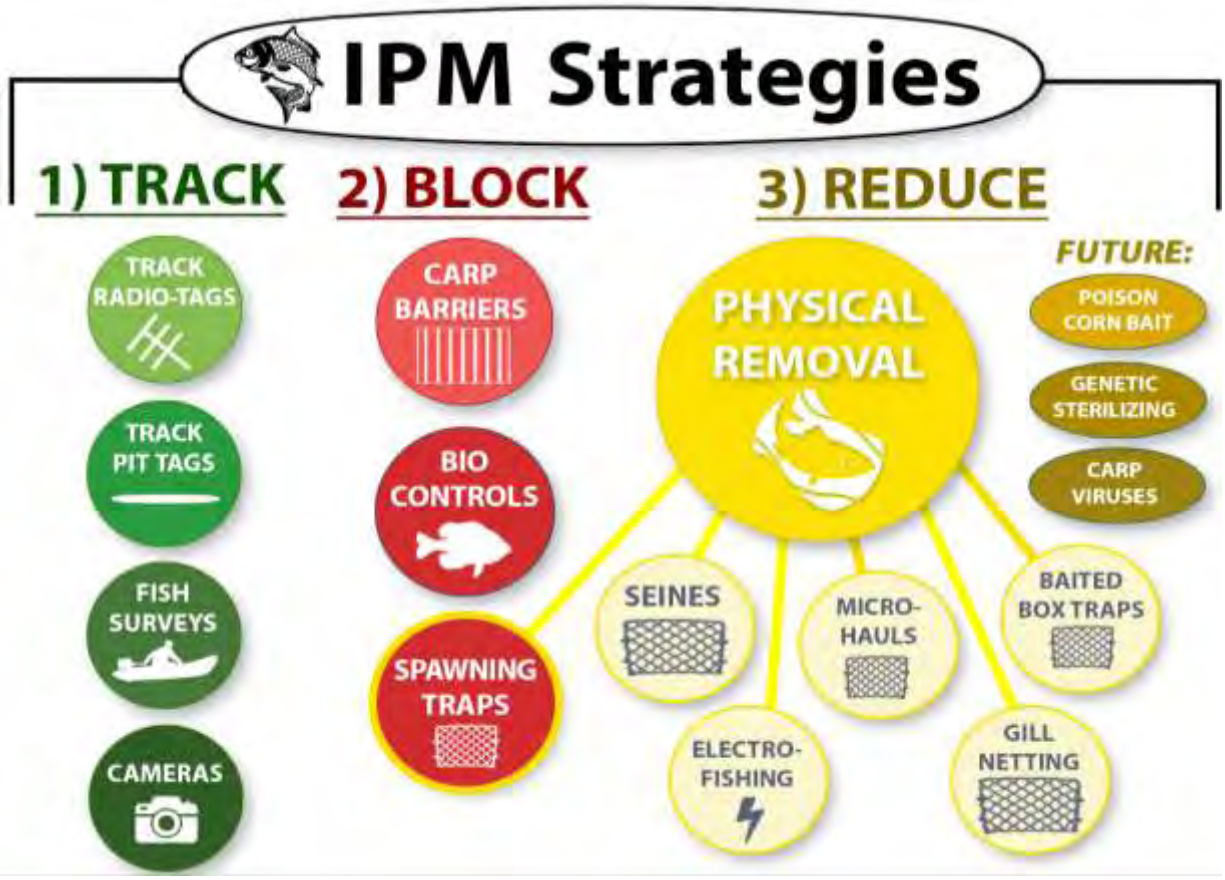


***Figure 1**. PLSLWD IPM Strategies*

1.3 INTEGRATED PEST MANAGEMENT APPROACH

This plan uses integrated pest management (IPM) principles to effectively manage the common carp populations. IPM involves the use of targeted carp removals and barriers, as well as monitoring environmental parameters that can inhibit or promote carp population growth within the waterbodies. Adaptive management will use data that is collected on the carp population including population and biomass estimates as well as migration routes and winter aggregation locations.

This IPM plan is intended to be a living document; using adaptive management may includedeveloping new management strategies and plan goals through data collection and analysis. As new data is collected and analyzed, current approaches, data collection efforts, and prioritization may change. This IPM aims to mitigate the effect that common carp are having on the load of excess nutrients to these lakes, and protect those that are currently meeting water quality standards.

1.4 REMOVAL METHOD SELECTION

By far, the single most expensive component to the IPM Plan is the REDUCE strategies (carp removals). With careful analysis and selection, the PLSLWD can select the best tool for the situation presented.

COST-EFFECTIVE COMPARISON OF METHODS

From January to June 2020, the removal methods were assessed for cost-effectiveness. Those results were pooled together in order to look at each method as a whole. The following table summarizes that assessment comparison with removal methods listed from most to least cost-effective:

Table 2. Cost-Effectiveness Comparison of Carp Removal Methods:

Removal Method	Total Pounds Removed	% of Total Lbs.	Approx. Cost	2020 $ per lb of carp removed	2021 Est. $ per lb of carp removed
Seine:	*13,528*	*45%*	$ 48,840	$ 3.61	$ 0.81
Micro-haul:	*565*	*2%*	$ 2,142	$ 3.79	$ 1.52
Specialized Trap Net:	*2,008*	*7%*	$ 27,716	$ 13.80	$ 2.12
Electrofishing:	*8,358*	*28%*	$ 20,000	$ 2.39	$ 2.39
Baited Box Trap:	*2,989*	*10%*	$ 18,754	$ 6.27	$ 3.17
Gill Netting:	*2,293*	*8%*	$ 15,000	$ 6.54	$ 3.56

Note that in some instances, costs are much lower in 2021 as all of the materials to deploy the method were incurred in 2020.

REMOVAL METHOD CONSIDERATIONS

PLSLWD will consider the following when deciding which removal methods to employ:

1) **Feasibility:** How likely will this method result in success? What are the obstacles?
2) **Time-Oriented:** Is immediate removal necessary to meet goal deadlines? Will the timeliness affect success of other projects (e.g. alum treatment)?
3) **Cost-Effective:** Is this method worth the cost based on anticipated results?
4) **Effort for Results:** Is this the best method for the amount of effort required? Given limitations of staff, what methods produce the greatest results for the least amount of effort?

The consideration questions and table above will provide staff with a decision-making tool. Given limited resources, staff will assess which method is most feasible, time-oriented, cost-effective, and requires the least amount of effort for the greatest result.

1.5 2020-2021 STRATEGIES & TIMELINE

The PLSLWD set an ambitious goal in 2019 to reach carp management levels of **30 kg/ha on both Spring & Prior Lakes** in 2020. While the PLSLWD made great strides in incorporating new, innovative removal techniques in the first half of 2020, it is still far from its goal.

The table below illustrates the amount of effort that it would take on each lake to reduce carp down to 30 kg/ha goal levels, given the different removal methods available and their anticipated maximum output. While the success and feasibility of the methods listed in these scenarios can be widely variable, this is meant to provide an example for planning purposes. All of the removal methods will be employed in 2020 & 2021.

Upper Prior Lake: 76,939 pounds reduction needed
Spring Lake: 112,238 pounds reduction needed

Table 3. EXAMPLE Illustration of Effort Required to Reach 30 kg/ha

Removal Method	UPPER PRIOR LAKE Estimated Pounds	SPRING LAKE Estimated Pounds	Timeline
Open Water Seine	20,000	20,000	*Fall 2020*
Gill Netting	2,000	2,000	*Fall 2020*
Electrofishing	2,000	2,000	*Fall 2020*
Under Ice Seine	35,000	35,000	*Winter 2021*
Under Ice Seine	0	35,000	*Winter/Spring 2021*
Spring Electrofishing	5,000	5,000	*Spring 2021*
Push Trap	2,000	2,000	*Spring 2021*
Gill Netting	5,000	5,000	*Spring 2021*
Baited Box Traps	1,000	3,000	*Summer 2021*
Gill Netting	2,000	2,000	*Fall 2021*
Electrofishing	2,000	2,000	*Fall 2021*
TOTAL	**76,000**	**112,000**	

Note that successful commercial seines are a large component to removal success on each lake. In 2021, PLSLWD will focus heavily on seine removals as its primary tool, supplementing with other tools to reach its goals. These other methods will be especially useful when populations are low enough not to be feasible to seine but high enough that more carp still need to be removed from the system.

Key supporting strategies will be employed to increase probability of removal success:

- **Tracking Carp:** Continuing to identify migration routes and aggregations for better removals
- **Blocking Carp:** Ensuring that carp barrier are working effectively; identifying additional spawning areas to block to ensure long-term population control after removals
- **Herding Carp:** Using underwater speakers to move carp into suitable seining areas
- **Removing Obstructions:** Diligently clearing known seine areas of any obstructions in October/early November prior to seine season. Checking seine areas with underwater drone so that obstructions can be cleared or avoided prior to removal events.

PART 2 - BACKGROUND

2.1 WATERSHED OVERVIEW

Located within Scott County, the PLSLWD lies in the Minnesota River Basin in the southwestern portion of the Twin Cities metropolitan area, and covers roughly 42 square miles of land area with over 2,500 acres of open water (Figure 1). Spring Lake, Upper Prior Lake and Lower Prior Lakes are the largest waterbodies within the PLSLWD and provide boating, fishing and other recreational opportunities. Spring Lake is connected by a natural channel to Upper Prior Lake which discharges to Lower Prior Lake which then outlets through a channel to the Minnesota River. All three lakes receive intense recreational pressure year-round and are important recreational resources to the Twin Cities metro area.

***Figure 2**. PLSLWD Location Map*

The protection and restoration of Spring and Prior Lakes are high priorities for the PLSLWD and are considered Priority Lakes by the Metropolitan Council for their high regional recreation value. A DNR public boat landing is located on each of the lakes, in addition to winter access points. Sand Point, a swimming beach on the north shore of Lower Prior Lake, boasts as much as 48,000 visitors each year. Open water activities on the lakes include fishing, boating, paddling, water skiing, jet skiing, sailing, wake boarding, and swimming. During the winter when the lake is ice-covered, recreational activities include snowmobiling, ice fishing, skating, and cross-country skiing.

Since 1970, the PLSLWD has strived to conserve, protect, and manage the water resources within the PLSLWD and have implemented a variety of projects aimed to improve water quality.

The aerial map in **Figure 2** shows some of the land uses and highlights the waterbodies and wetland areas that carp may be present and/or use as spawning areas. **Figure 3** shows the topography throughout the watershed and some of the hydrological connections that carp might use to travel between waterbodies.

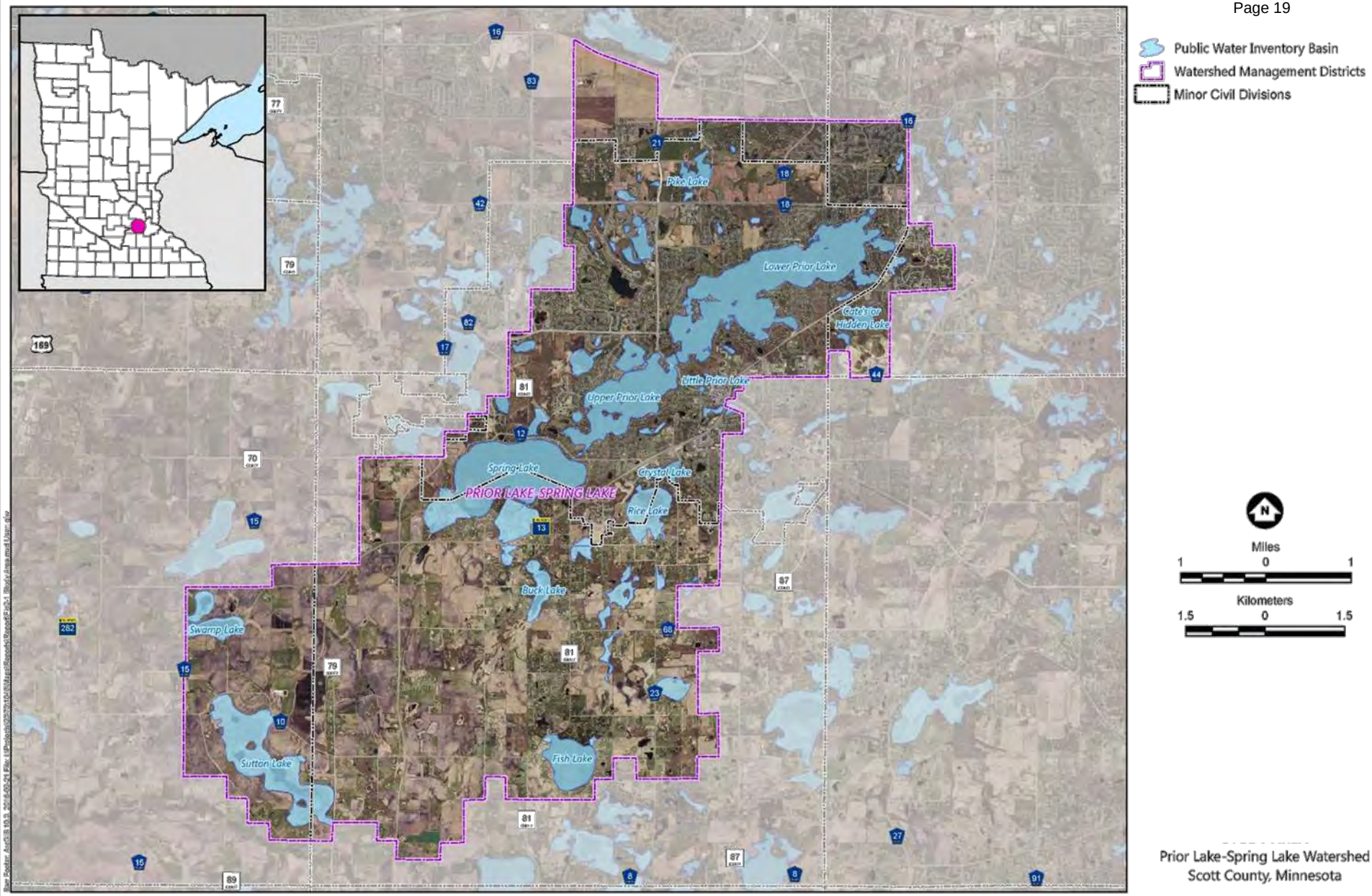


Figure 3. Watershed Overview Map

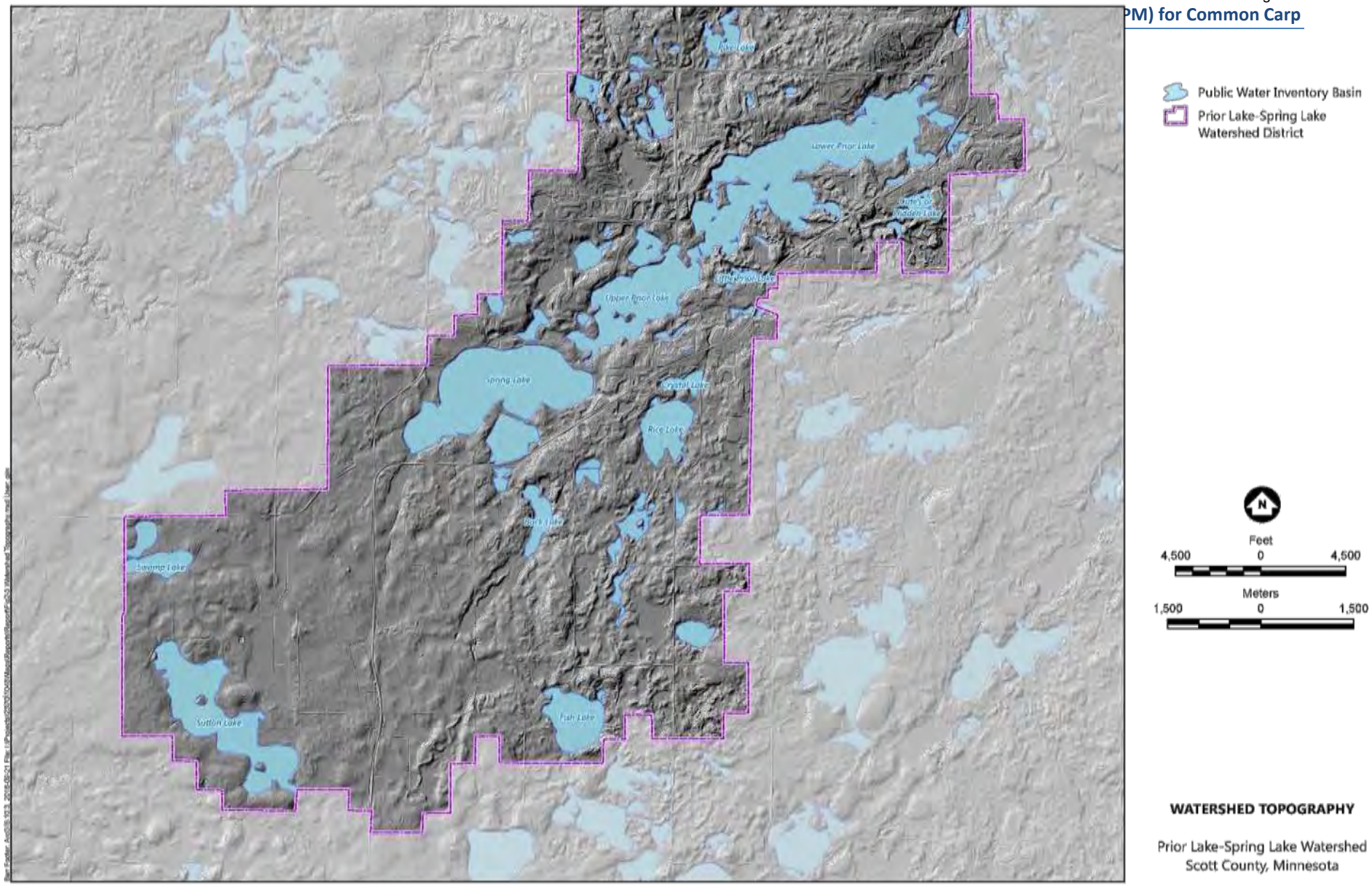


Figure 4. Topographic Map

2.2 COMMON CARP SPECIES

Common carp (*Cyprinus carpio*), a non-native fish originating in the Caspian region of Eurasia, are the most widely distributed nuisance fish in the United States (Nico et al., 2012). Carp were intentionally introduced into Minnesota in the 1880s as a game fish and as a food staple for the increasing number of immigrants. By the turn of the century, the previously prized carp was considered a nuisance species for its rapid reproduction and detriment to water quality in the Minnesota's lakes.

A. Life Cycle

Given ideal conditions, carp can be highly prolific. Carp eggs hatch usually within a week and it only takes about 15–30 days before feeding larvae grow into advanced fry. The next life stage, when the fish grows up to become a fingerling, lasts only about 45–85 days. By the end of their first summer, carp are known to get up to as much as 10 inches long, weighing 1 – 2 pounds.

They mature as early as two years old, when the carp is roughly 12-15 inches long. A single female carp can produce over a million sticky eggs which get laid onto vegetation and rocks. While most eggs and larvae die before they reach adulthood, this can result in several hundreds of successful offspring in a single season where there are no bluegills predators present and conditions are right. Floods seem to provide especially favourable conditions for carp breeding.

A. Diet

Carp are omnivores and they consume a variety of small foods including molluscs, crustaceans, insect larvae and seeds. These food items are sucked up with the mud from the bottom of the lake or wetland and filtered out using their gill rakers, spitting out the mud and remaining debris into the water column. Carp can also consume plant material and other organic matter, especially when other food sources are not available. Carp rarely eat fish, but may consume fish eggs and larvae and disturb breeding sites for other fish species.

B. Habitat & Behavior

Like largemouth bass, carp can inhabit a wide range of habitats, but they prefer lakes and slow moving rivers, especially those with turbid water. Carp also can be found in areas where there is abundant aquatic vegetation. They are capable of tolerating a range of environmental conditions. Carp have a greater tolerance of low oxygen levels, pollutants and turbidity than most native fish, and are often associated with degraded habitats, including stagnant waters.

The bottom-feeding habits of carp often create murky lake conditions, and muddy up the water. These conditions are often unsuitable for native fish, and carp drive out their competition for lake resources.

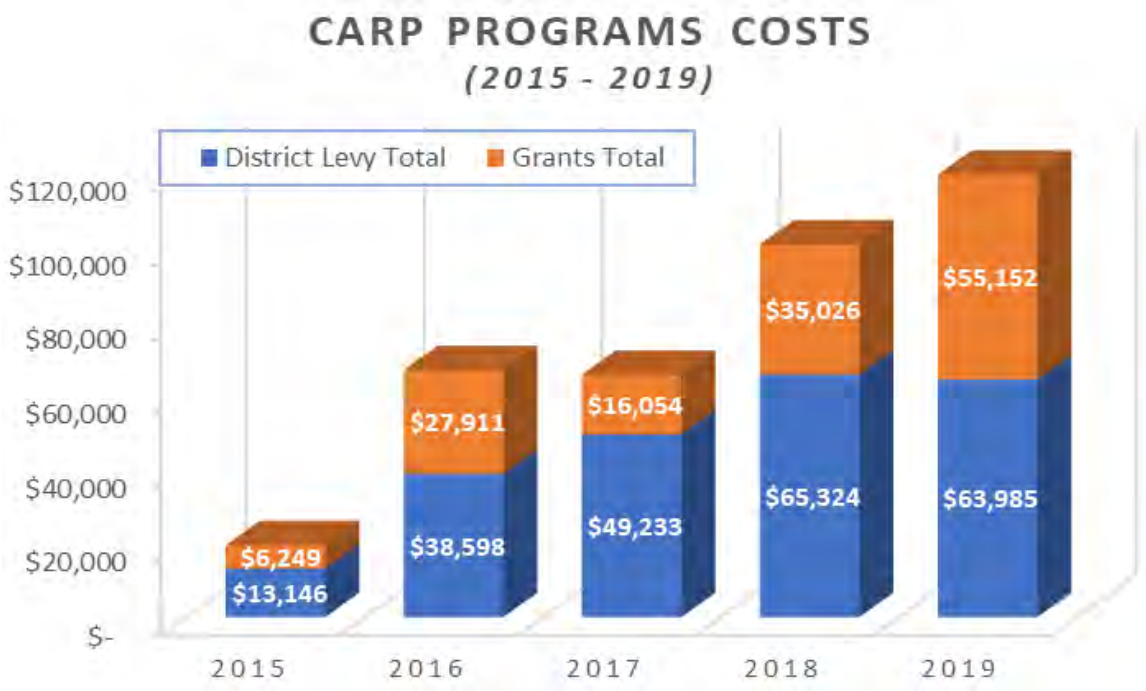
Carp travel in schools, usually of five or more. Carp migrate to and from breeding grounds in large groups during the spawning season, sometimes travelling several miles upstream. This behavior of traveling to shallow, upstream spawning areas allows them to reach wetlands have winterkilled either frozen over or had dry, low oxygen conditions in the previous season that winterkilled any sunfish that would have predated on the carp eggs and larvae.

B. Effects

Carp can have direct and indirect negative effects on water quality by uprooting submergent and emergent aquatic vegetation and by releasing phosphorous sequestered in lake sediments. The phosphorus is then available to free floating algae and can lead to an increase in total phosphorous and Chlorophyll-a concentrations in the lake and to a decrease in water clarity. By removing the carp from the system, both the phosphorus within the carp carcass and the amount that would typically be excreted will be completely removed, while also abating the release of phosphorus created by foraging behavior.

2.3 CARP MANAGEMENT FUNDING SOURCES

The District has been fortunate enough to receive multiple sources of grant funding since 2015 to support its carp management efforts. The following is a summary of the funding received:



GRANT SOURCE	GRANT $	TIMEFRAME
MPCA Clean Water Partnership	**$67,323**	***2015 - 2018***
DNR Clean Water Legacy Grant	**$17,917**	***2017 - 2018***
Federal Clean Water Act Section 319 grant	**$80,300**	***2019 - 2021***
BWSR Metro Watershed Based Implementation Funding	**$144,000**	***2019 - 2021***
TOTAL:	**$309,540**	

PART 3 - CARP MANAGEMENT WATERBODIES

3.1 CARP MANAGEMENT LAKES

While there are 14 lakes within the PLSLWD, this IPM Plan is focused only on those eight connected waterbodies that are known carp migration routes and/or are suspected to contain common carp as shown in Figure 4 below (Fish, Buck, Spring, Arctic, Upper Prior, Lower Prior, Jeffers Pond & Pike Lakes). An overview of each carp management lake is listed below.

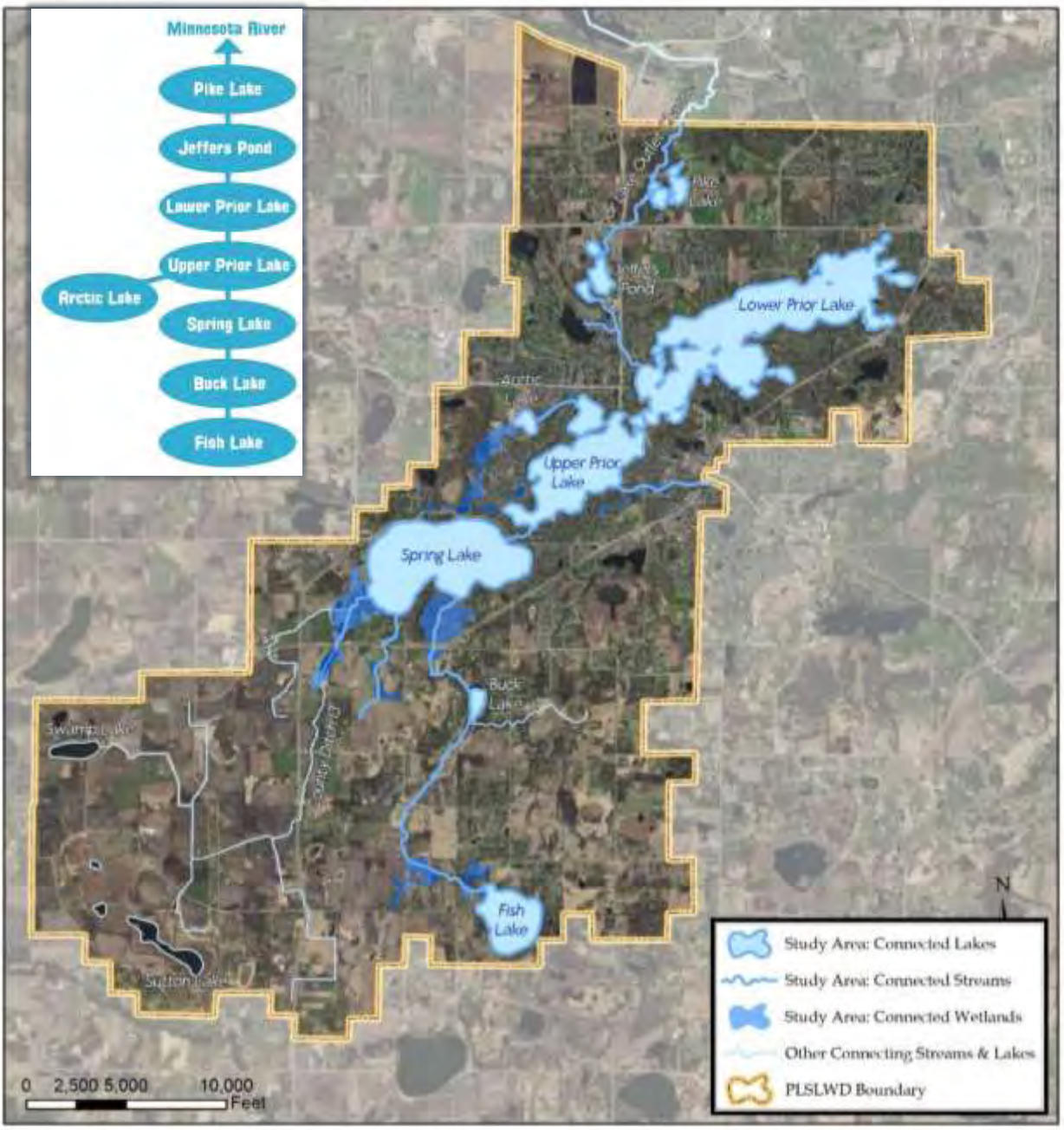


Figure 5. Carp Management Lakes

3.2 FISH LAKE

Fish Lake is a relatively small lake found in the upper watershed. Fish Lake is approximately 173 acres, has an average depth of 14 feet, and a maximum depth of 28 feet. Roughly 74 acres or 43% of the lake is considered littoral. Fish Lake is a seepage lake-outflow, meaning that there is no direct inflow to Fish Lake; rather, the hydrologic contribution is from watershed runoff and groundwater which then flows out of Fish Lake to the north towards Buck Lake.

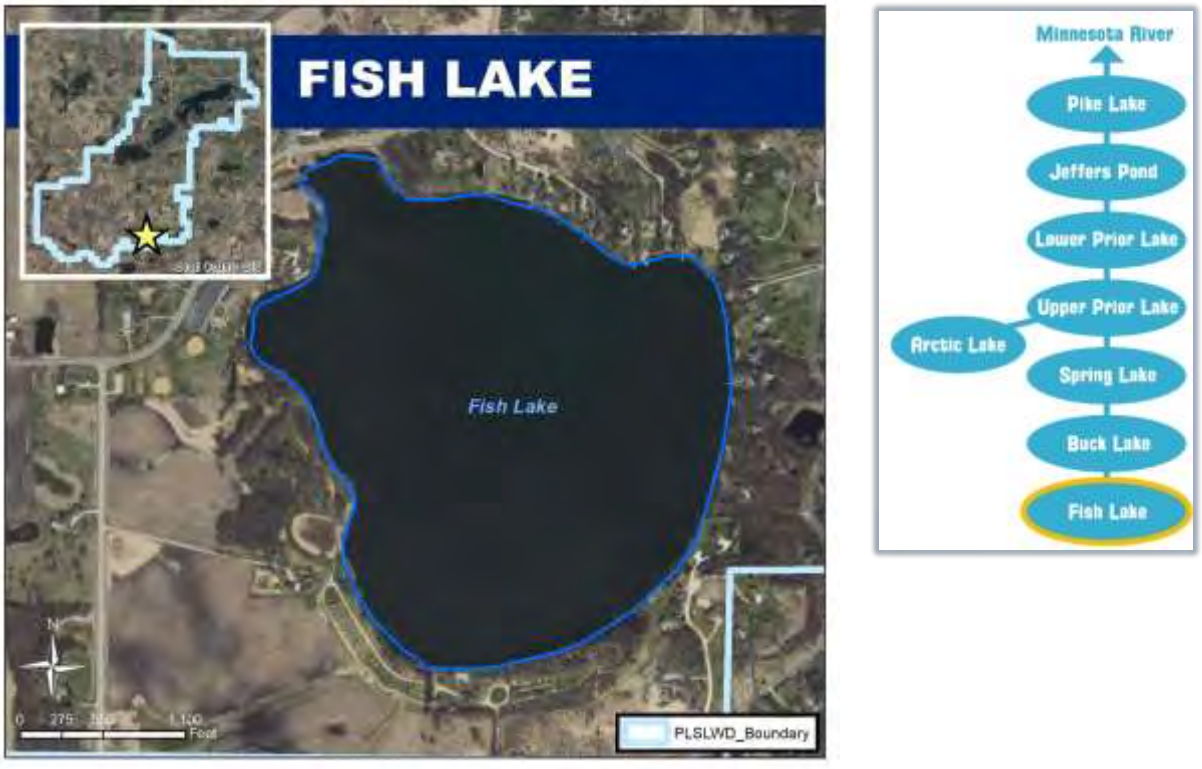


Figure 6. Fish Lake Map

INTERNAL LOADING

Fish Lake appears to be heavily impacted by internal loading. The 2006 Fish Lake Sustainable Lake Management Plan identifies an internal load ranging from 111 to 488 kg/yr (244 to 1,075 pounds/yr). The methodology used to derive this estimate is derived from a Canfield-Bachmann model. These models identify internal loading from anoxic release, hypolimnetic mass balance, and fall turnover; no analysis was done to determine the contribution from curly-leaf pondweed (CLP) senescence or from the foraging behavior of rough fish.

FISHERIES ASSESSMENT

A potential source of internal loading is from rough fish bioturbation. MN DNR fishery survey data from 2014 shows that carp and bullhead are present in Fish Lake. LaMarra (1975) identified an internal loading rate of 1.07 mp P/m²/day based on a carp density of 200 kg/ha. A very preliminary fish survey was conducted in fall of 2019 on Fish Lake and showed carp biomass at 88.7 +/- 69.2.

3.3 BUCK LAKE

Buck Lake is a small lake (23 acres) located downstream of Fish Lake in the upper watershed. The maximum depth is 9 feet; no numerical average depth given but average depth is noted as shallow. It is assumed, based on maximum depth that the entire lake is littoral. Buck Lake receives water from the connecting channel to Fish Lake and from the watershed to the East. Buck Lake then outflows to the north through a large wetland complex to Spring Lake.

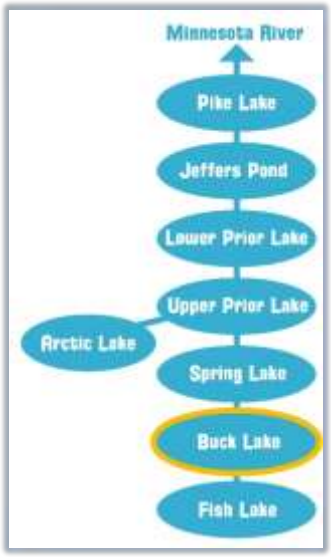


Figure 7. Buck Lake Map

INTERNAL LOADING

The watershed to lake ratio for Buck lake is quite high: ~837:1, which may result in a large amount of phosphorus loading to Buck Lake from the surrounding watershed. The average TP concentration for Buck Lake between 2014 and 2017 was 112.56 µg/l (almost twice the state standard).

While not specifically assessed, anoxic conditions within Buck Lake may be contributing to the phosphorus load through anoxic release within sediments. No assessment has been completed on the sediments in the Buck Lake basin to determine the sediment release rate of TP.

FISHERIES ASSESSMENT

Very preliminary survey data from fall 2019 indicates that carp have low populations on Buck Lake. The widespread presence of aquatic vegetation in Buck Lake also may hint at a low density of rough fish presence in the lake. Typically, lakes that support high rough fish density are incapable of supporting dense or widely-distributed aquatic vegetation.

3.4 SPRING LAKE

Spring Lake is the second largest basin in the PLSLWD. The maximum depth is 34 feet with an average depth of 18 feet. Roughly half (49% or 290 acres) is identified as the littoral area. The watershed is quite large (12,340 acres) with a watershed to lake ratio of 20:1, which is a moderate ratio.

Spring Lake has three (3) major inflows located primarily on its southern and western sides. The 12/17 wetland on the northwest side of the lake also contributes to the overall water budget. County Ditch 13 provides the largest contribution to external load. Spring Lake outlets on its eastern side via a small channel which connects to Upper Prior Lake.

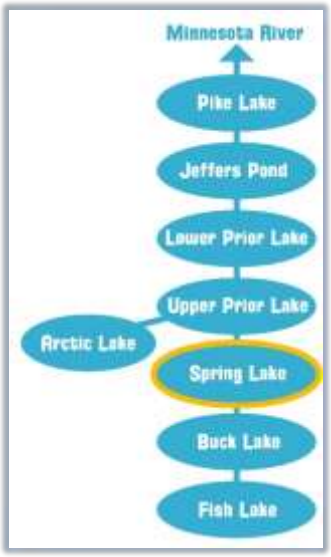


Figure 8. Spring Lake Map

INTERNAL LOADING

Internal loading constitutes the bulk of the total phosphorus load to Spring Lake at 5,161 lbs/year or 49%. Internal loading may be from anoxic sediment release of phosphorus, senescence of aquatic vegetation during the growing season, and overabundant rough fish. The 2012 TMDL attributed the entire internal load to anoxic release; however subsequent fisheries surveys documented elevated carp biomass which may be heavily influencing the internal phosphorus load and subsequently, water quality in Spring Lake.

FISHERIES ASSESSMENT

Past surveys show elevated carp biomass in Spring Lake, which is influencing internal loading. In winter 2012, the PLSLWD marked 1,752 adult carp by inserting floy tags in the dorsal area. The carp were initially captured using a commercial fishing crew that deployed a seine net around a winter

aggregation of common carp. The carp were captured, measured for length and weight, tagged, and released. An attempt was made to recapture the carp in 2013, but was unsuccessful.

Past surveys show elevated carp biomass in Spring Lake, which is influencing internal loading. A 2014 study completed by St. Mary's University using a catch per unit effort (CPUE) model showed that carp biomass in Spring Lake was 343.5 kg/ha. A subsequent survey completed in 2016 by WSB showed 122.5 kg/ha using the CPUE method and 84.7 kg/ha using a mark-recapture methodology. Using this abundance estimate and LaMarra's estimation of calculating loading due to an abundance of rough fish, nearly 2.37 pounds of phosphorus per day were being added to Spring Lake. This number equates to an estimated loading rate of over 866 pounds of phosphorus per year caused by the overabundance of common carp.

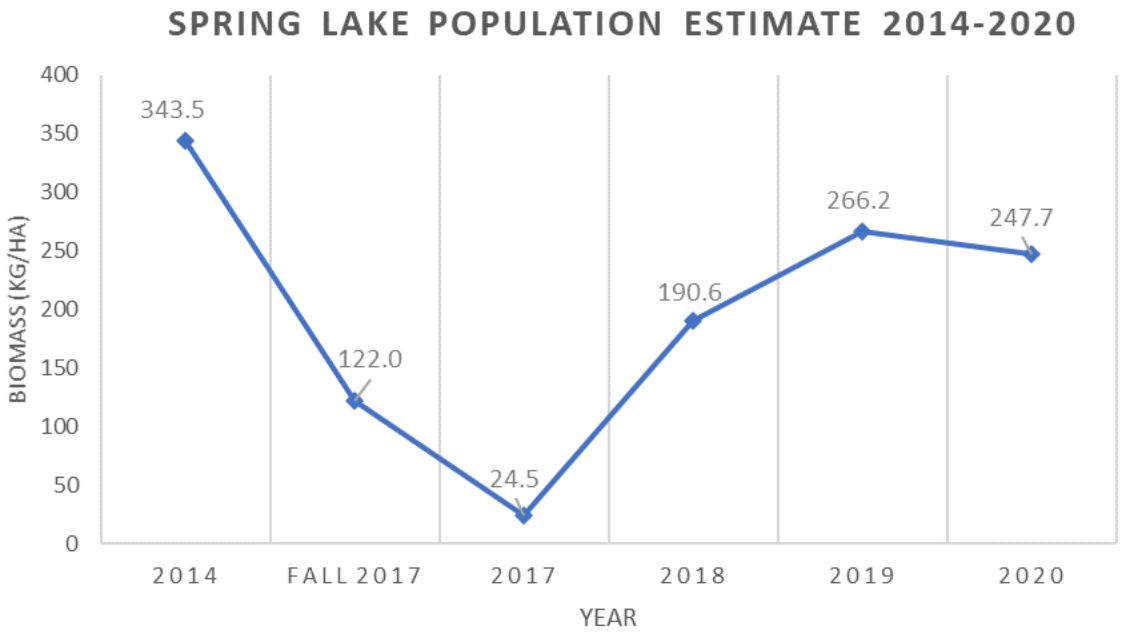


Figure 9. Spring Lake Population Estimate 2014 - 2020

PAST CARP MANAGEMENT EFFORTS

Carp in Spring Lake were netted and inspected for marks on January 30, 2017 as part of a recapture and removal event capturing 2,577 individual carp, an estimated 59.9 kg/ha of carp biomass resulting in a reduction of 615.5 pounds of phosphorus per year. Using the ratio of marked to unmarked carp, WSB calculated a pre-removal population estimate of 3,623 ± 1,167 individual carp in Spring Lake. Using a 5.6 kg average weight, Spring Lake carp biomass was calculated at 84.9 ± 27.3 kg/ha, close to the ecological threshold value of 100 kg/ha and well above the value of 30 kg/ha that PLSLWD has identified as a biomass goal. Biomass calculated after removal is estimated to be 24.5 kg/ha ± 7.9.

During 2018 and 2019 there were not successful seine removal events and the population rebounded quickly. In the spring and summer of 2020, PLSLWD decided to add Accelerated Carp Management Strategies and different removal techniques to its toolbox. As of September 1st, a total

of 8,070 pounds of carp have been removed from Spring Lake using these new tools, as well as another 3,078 pounds using traditional open water seines.

3.5 ARCTIC LAKE

Arctic Lake is 33 acres in size with a maximum depth of 30 feet and an average depth of 9.5 feet. Arctic Lake flows into Upper Prior Lake, entering a large shallow bay on the north side of the lake through an man-made channel. Arctic Lake's watershed is 507 acres resulting in a 15:1 watershed to lake ratio, which is relatively small. Most of the watershed (56%) is composed of wetlands and woodlands with the remaining portions of the watershed composed of residential, prairie, water, open space, and cropland.

Figure 10. Arctic Lake Map

INTERNAL LOADING

Sediment release rates from sediment coring was not available at the time the 2013 diagnostic report was drafted. However, HDR attempted quantify the internal load from anoxic sediment release using a mass balance approach. Results of this analysis showed that annual loading ranged from 177-327 lbs TP/year.

FISHERIES ASSESSMENT

Carp have been documented in multiple fish surveys completed in 2012, 2014, 2017, and 2018. The 2012 survey utilized standard and mini trap nets to determine assemblage and size structure. Small carp (9.5-13") were captured in trap nets which indicates recruitment and suggests that Arctic Lake was functioning as a nursery. The 2014 electrofishing survey determined that the carp biomass density was 264.5 kg/ha and found numerous young of the year carp.

A carp mark-recapture population and biomass estimate were completed in 2017. Survey data shows that the carp biomass for Arctic Lake was 462.6 kg/ha, with juvenile carp dominating the biomass (336.9 kg/ha) and adults making up a smaller portion of the biomass (125.7 kg/ha). Note that a carp barrier was installed in 2016 at the connection to Upper Prior from Arctic, which may have prevented migration out of Arctic to Upper Prior, resulting in higher biomass than in 2014.

PAST CARP MANAGEMENT EFFORTS

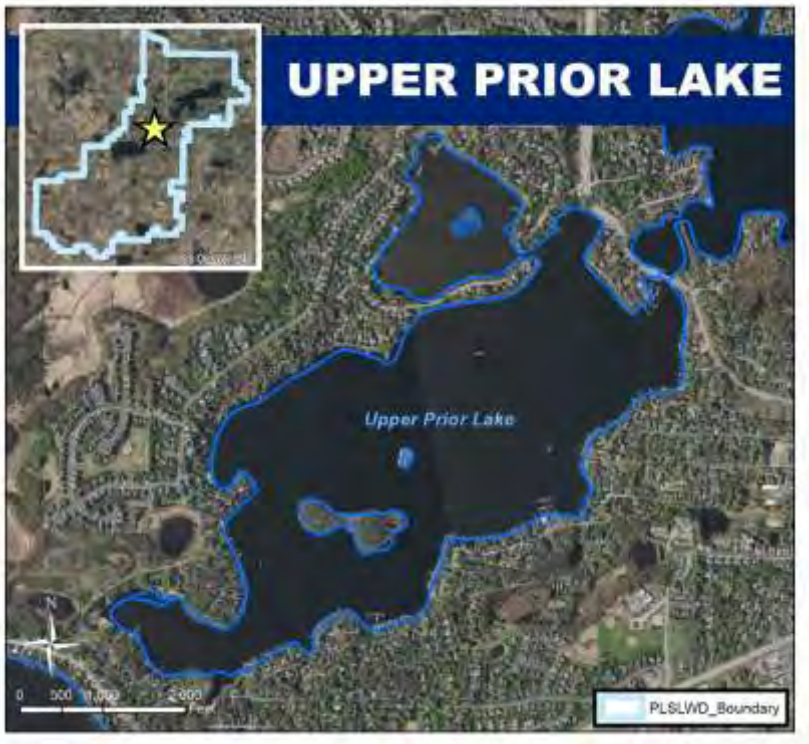
In 2017 to 2018, an estimated 398 kg/ha of carp biomass was removed from Arctic Lake resulting in a reduction of 230 pounds of phosphorus per year. The monitoring of the recruitment rates of young carp to the system is likely to continue through the partnership these groups formed in 2013 and the actual effects of this removal on the phosphorus concentrations will be monitored by regular sampling throughout the growing months (May-September) of each year.

Table 4. Arctic Lake Biomass & Loading Rate Before & After Removals

	Carp Biomass Estimate (kg/ha)	Phosphorus Loading Rate (lbs/year)
Before Removal	460.0	265
Reduction Amount	**-398.0**	**-230**
After Removal	62.0	35

3.6 UPPER PRIOR LAKE

Upper Prior Lake is 416 acres in size with a maximum depth of 43 feet and an average depth of 10 feet. The littoral zone covers 329 acres or 79% of the basin. The lake receives water from Spring and Arctic



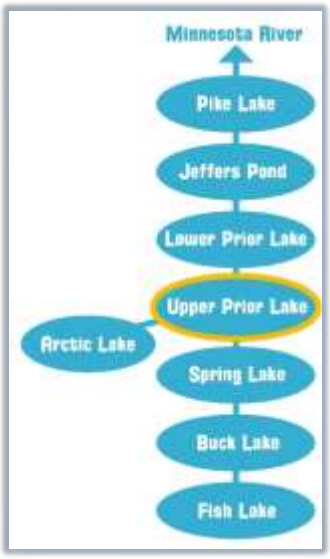


Figure 11. Upper Prior Lake Map

Lakes as well as from a small drainage area on the east side of the lake. The watershed is 16,038 acres resulting in a watershed ratio of 38:1.

INTERNAL LOADING

The internal load of Upper Prior is a major cause of water quality impairment in Upper Prior Lake. The 2012 TMDL indicates that 50% of the total phosphorus budget comes from internal loading. The TMDL assigns the entire internal load to anoxic sediment release; however, Upper Prior supports elevated carp biomass which may contribute and/or exacerbate internal loading.

With the upstream alum treatment of Spring Lake to reduce internal nutrient loading, lower concentrations of phosphorus are reaching Upper Prior Lake. However, past studies have indicated that there is still an internal reservoir of phosphorus in Upper Prior Lake that continues to hinder the improvement of water quality in the lake.

FISHERIES ASSESSMENT

A number of carp were marked with a right pelvic and pectoral fin clip, radio tags, and passive integrated transponder (PIT) tags in Upper Prior Lake in 2015 and 2016. A mark-recapture estimate was calculated using the total number of fin clips and radiotags captured.

The biomass estimate as a result of this mark-recapture event was 13,840 ± 3,664 individuals in Upper Prior Lake before the removal. Using a 6 kg average weight, Upper Prior Lake biomass was calculated at 531.3 kg/ha ± 140.6, a biomass well above the 30kg/ha biomass goal identified by the PLSLWD.

Using LaMarra's estimation of loading due to an abundance of rough fish, nearly 10.54 pounds of phosphorus per day were being added to Upper Prior Lake as a result of this elevated population. This number equates to a loading rate of over 3,840 pounds of phosphorus per year caused by the overabundance of common carp.

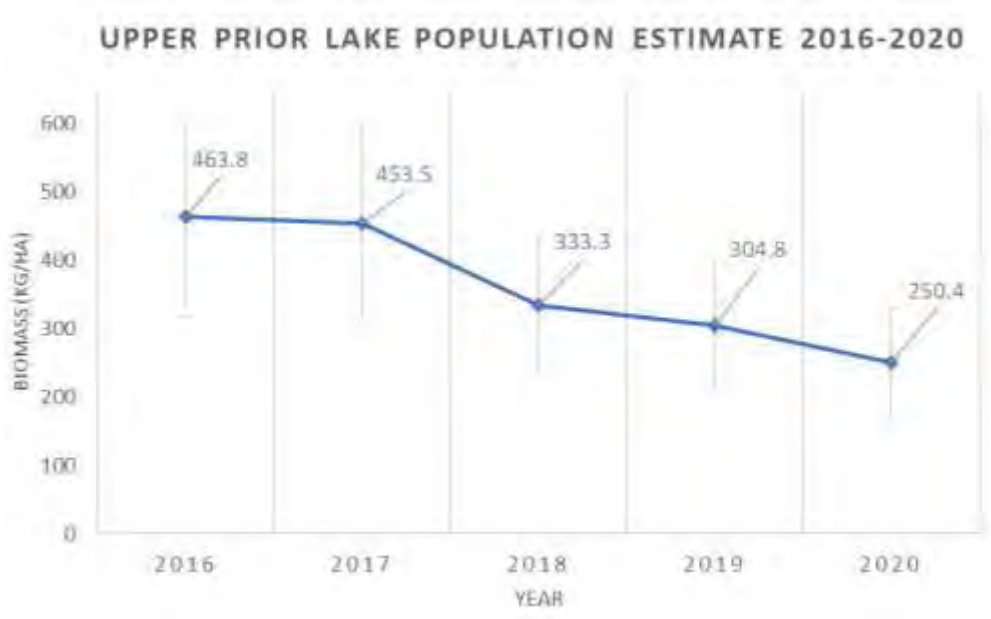


Figure 12. Upper Prior Lake Population Estimate 2016-2020

PAST CARP MANAGEMENT EFFORTS

In the fall and winter of 2017-18, an estimated 113 kg/ha of carp biomass were removed from Upper Prior Lake resulting in a reduction of 845.8 pounds of phosphorus per year.

In the spring of 2019, two seine nettings and one electrofishing effort were completed in Crystal/Mud Bay, removing a total of 10,000 pounds of carp from Upper Prior Lake.

In the spring and summer of 2020, PLSLWD decided to add Accelerated Carp Management Strategies and different removal techniques to its toolbox. As of September 1st, a total of 8,142 pounds of carp have been removed from Upper Prior Lake using these new tools, as well as another 10,450 pounds using traditional open water seines.

The monitoring of the recruitment rates of young carp to the system is continuing on a yearly basis and the actual effects of this removal on the phosphorus concentrations will be monitored by regular sampling throughout the growing months (May-September) of each year.

3.7 LOWER PRIOR LAKE

Lower Prior Lake is the largest basin in the watershed at 940 acres. It has a maximum depth of 56 feet and an average depth of 13 feet; roughly 39% of the lake or 373 acres is in the littoral zone.

Water flows into Lower Prior from Upper Prior under the County Highway 21 Bridge and is the only major inflow; the remaining hydrology is derived from direct drainage from adjacent upland areas. The lake's outlet is the Prior Lake Outlet Channel (PLOC) located along the western portion of the lake. The watershed of Lower Prior is 18,904 acres, resulting in a moderately-sized 20:1 watershed to lake ratio.

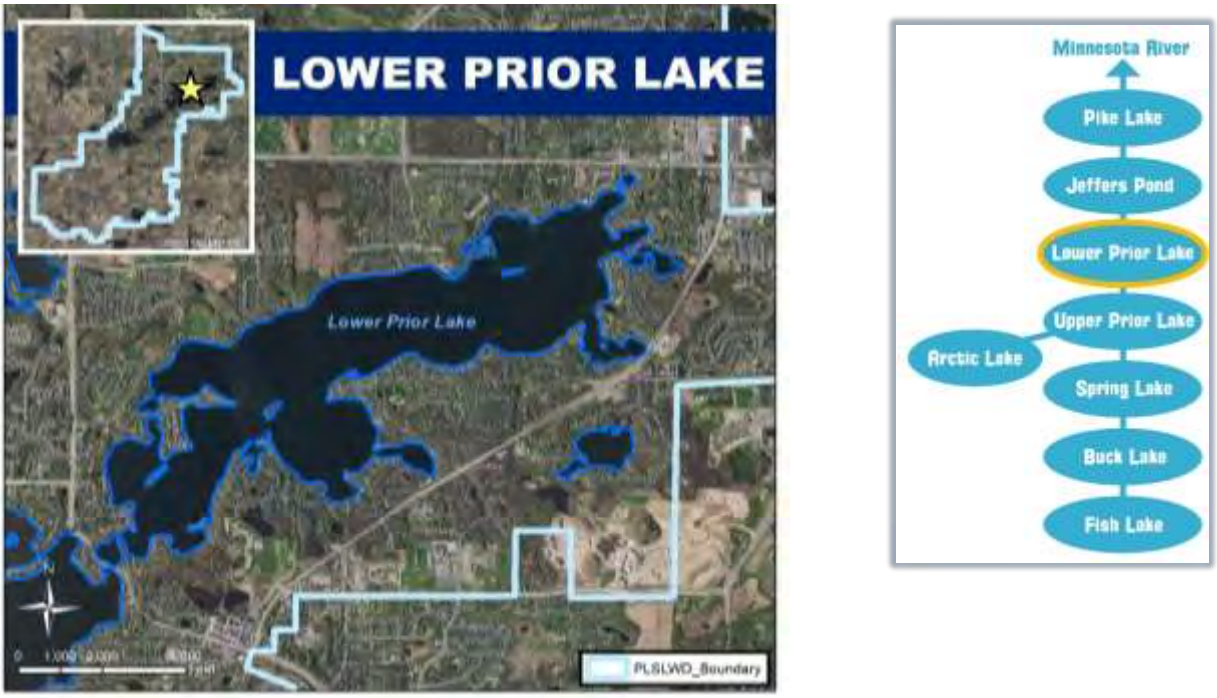


Figure 13. Lower Prior Lake Map

INTERNAL LOADING

The 2013 Diagnostic report discusses internal loading from sediment release as a possible source of loading but does not quantify the potential loading from this source.

FISHERIES ASSESSMENT

Carp are present in Lower Prior Lake and may travel freely between Lower Prior and Upper Prior Lakes through the existing connection under Eagle Creek Avenue (County Road 21). However, a biomass estimate completed in 2016 using a catch per unit effort (CPUE) model indicates that the annual load from carp is 158 lbs TP/year. Based on this, carp are not a significant source of phosphorus to Lower Prior Lake.

3.8 JEFFERS POND

Jeffers Pond is located downstream of Lower Prior along the PLOC. Jeffers Pond is divided into two basins (East and West Jeffers) separated by a narrow land bridge. The PLOC flows into the south side of West Jeffers and flows out on the north side of East Jeffers. The basins are connected by a series of cascading streams. Jeffers is 39 acres in size with a maximum depth of 70 feet (no average depth listed, total acreage includes both basins).

Figure 14. Jeffers Pond Map

INTERNAL LOADING

No diagnostic study has been completed to determine the phosphorus load (internal or external) to Jeffers Pond, nor is there any water quality data available to determine the impairment status of Jeffers Pond.

FISHERIES ASSESSMENT

MnDNR lake fisheries surveys from 2016 suggest that common carp is a potential carp nursery site, as many juvenile carp were documented. This could potential be source for new recruitment to Pike Lake downstream. Anecdotal information suggests that carp are possibly present in nuisance levels in Jeffers Pond.

3.9 PIKE LAKE

Pike Lake is the downstream-most basin in the watershed; located along the PLOC at the northern end or bottom of the watershed. Pike is 50 acres in size with a maximum depth of 9 feet and an average depth of 7 feet, resulting in the entire basin being littoral. The west side of Pike Lake is part of the PLOC and receives constant flow through the system. The east side of Pike Lake is more stagnant and receives runoff from the nearby feedlot and agricultural lands across the road to the east, creating a contrast in water quality compared to the west side

Figure 15. Pike Lake Map

INTERNAL LOADING

Based on available water quality data, Pike Lake is listed as impaired for nutrients. The 2020 Lower Minnesota River Watershed TMDL Report identified benthivorous fish, such as common carp, as a "phosphorus source that is higher priority for targeting", along with sediment release and curly-leaf pondweed as internal phosphorus sources to Pike Lake. With an internal load of 2,957 lbs of phosphorus per year, the study recommended reducing internal loading by 99% in the east basin and 87% reduction in the west basin.

FISHERIES ASSESSMENT

SMSC completed a Pike Lake Fishery Assessment in 2020. This study concluded that the carp population is likely as much as three times the level recommended by the MnDNR at 100 kg/ha. While this initial study was only able to grab a small sample, it did conclude that the carp population is at 287.2 ± 137.9 kg/ha. SMSC's assessment is part of a larger carp management project that is funded by a grant that goes through the end of 2021, and includes tracking and removals.

When overlaying the age structure of carp with bluegill ages in Pike Lake, it is interesting to note that all the carp analyzed were between 5.5 and 9.5 years old at capture. All samples of bluegill were all younger than four years. This shows a direct relationship between bluegills and carp.

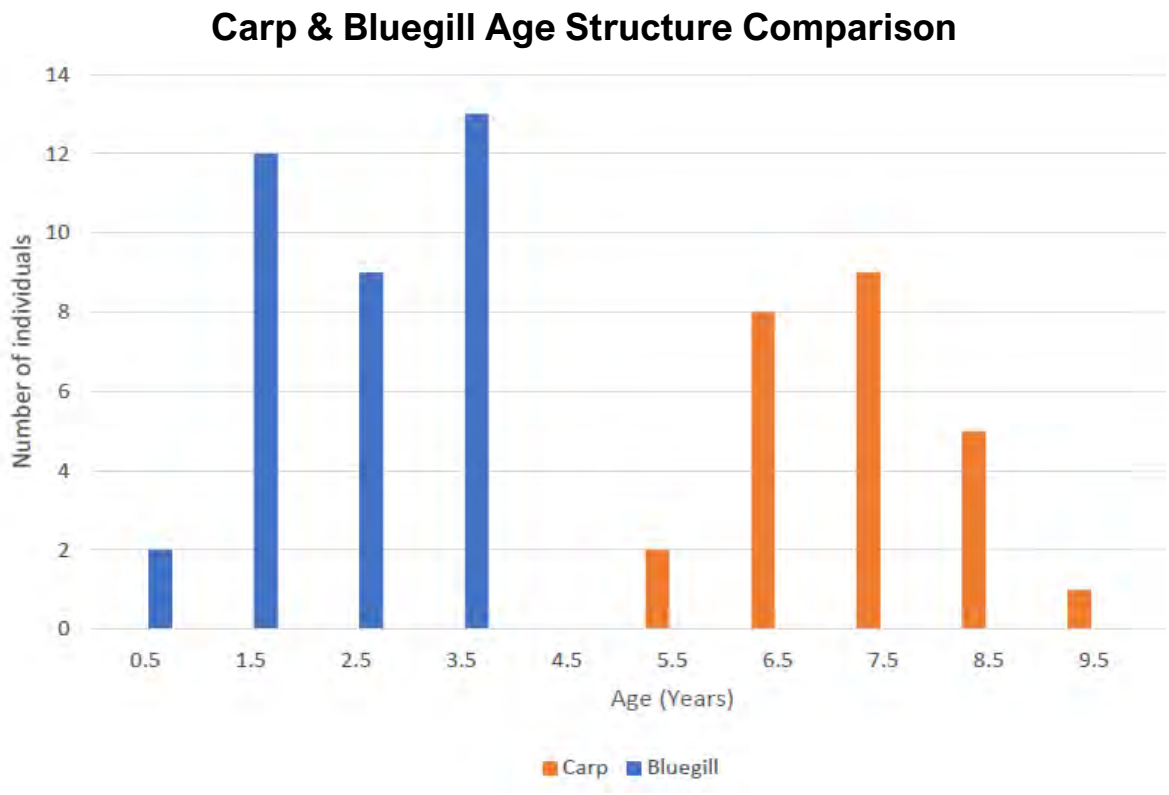


Figure 16. Carp & Bluegill Age Structure Comparison in Pike Lake (2020)

PART 4 - CARP MANAGEMENT GOALS

Through this IPM Plan, the District has developed a holistic approach to carp management, treating the entire connected watershed system as a whole. While it is the long-term goal of the District to see all of its lakes reach the water quality goal of 30 kg/ha of carp, the lakes must be prioritized and management focused to address the most imperative concerns first. As carp management information on the lakes and new techniques are always changing, this IPM Plan will address three-year goals.

4.1 PRIORITY LAKES

While it is the District's long-term goal to maintain carp populations below the water quality management level on all waterbodies, this IPM Plan prioritizes those lakes that receive the most public use and those that are most affected by poor water quality, as well as their associated waterbodies that may harbor or support carp recruitment.

PUBLIC ACCESS LAKES

The four lakes in the PLSLWD with public access are listed below with highest public use listed first:

1) Lower Prior Lake
2) Upper Prior Lake
3) Spring Lake
4) Fish Lake

Of these four, only Upper Prior Lake and Spring Lake have documented detrimental levels of carp.

TMDL LAKES

A review of Minnesota Pollution Control Agency's website on December 18, 2018 shows the list of impaired waters located within the PLSLWD as identified in the table below.f these lakes, only Spring and Upper Prior have approved total maximum daily load (TMDL) reports and an associated TMDL implementation plan completed. Pike Lake and Fish Lake TMDL reports were completed in 2020 as part of the Lower Minnesota River Watershed TMDL.

Table 5. List of Impaired Lakes in PLSLWD:

WATER BODY	YEAR LISTED	AFFECTED USE	POLLUTANT OR STRESSOR
Fish Lake	2002	Aquatic recreation	Nutrient/eutrophication biological indicators
	2006	Aquatic consumption	Mercury in fish tissue
Lower Prior Lake	2002	Aquatic consumption	Mercury in fish tissue
	2018	Aquatic life	Fishes bioassessments
Pike Lake	2002	Aquatic Recreation	Nutrient/eutrophication biological indicators
Spring Lake	1998	Aquatic Consumption	Mercury in fish tissue
	2002	Aquatic Recreation	Nutrient/eutrophication biological indicators
	2018	Aquatic life	Fishes bioassessments
Upper Prior Lake	2002	Aquatic Consumption	Mercury in fish tissue
	2002	Aquatic Recreation	Nutrient/eutrophication biological indicators

PRIORITY LAKES DETERMINATION

As they are listed as Tier 1 Lakes in the PLSLWD's 2020-2030 Water Resources Management Plan, receive the highest public use, and are currently on the *state's impaired waters list,* the District has established the following two lakes as its **top carp management priority:**

- **Upper Prior Lake**
- **Spring Lake**

In addition, the PLSLWD supports the efforts of SMSC as the lead partner on tracking and reducing carp populations in Arctic and Pike Lakes. Arctic Lake is directly connected to Upper Prior Lake and Pike Lake has a current TMDL that has identified rough fish as a major contributor to internal loading. As such, the PLSLWD has established the following two lakes as its secondary supportive carp management priority:

- **Arctic Lake**
- **Pike Lake**

4.2 COST-BENEFIT ANALYSIS

The PLSLWD attempts to be as cost-effective as possible in all of its practices. In 2020, the PLSLWD completed a cost-benefit analysis comparison on its carp program compared to other District projects (see Attachment C). A 10-year annualized cost was used to compare the carp management program results on Upper Prior Lake to other projects in the District:

Cost-Benefit Comparison of District Projects

(Based on 10-Year* Annualized Total Cost of a Project)

$ / lb TP Removed	Project
$81	Upper Prior Lake Alum Treatment *(based off grant information)*
$97	Carp Management Project *(based on 2015-present costs & results)*
$202	Ferric Chloride System *(*Note: based on 25-year annualized cost)*
$252	Fish Point Park Iron-Enhanced Sand Filter
$1,131	Indian Ridge Biofiltration Basin
$1,136	Fairlawn Shores Biofiltration Basin

Based on this analysis, the PLSLWD concluded that carp management was indeed cost-effective. However, all the different carp removal tools do not always produce the same result. To that effect, the PLSLWD will also consider cost-benefit when choosing carp management goals and tools. At some point, the PLSLWD may decide that reducing carp populations from 50 kg/ha to 30 kg/ha would not be worth the cost, as it is increasingly more expensive to reduce carp populations when the existing biomass is already low. This will be assessed during each annual update of the IPM Plan.

4.3 CARP MANAGEMENT STRATEGIES & GOALS

The PLSLWD has three distinct overarching strategies for carp management. At the direction fo the Board of Managers, there are two accelerated carp management goals for Upper Prior and Spring Lakes to reduce and maintain overall carp populations to below the water quality threshold. To help achieve successful long-term management without carp population rebound, it is important to also take steps to

block recruitment and to understand how the connected system works as a whole to better management the carp population.

CARP MANAGEMENT STRATEGIES:

1) **Comprehensively TRACK carp to improve the understanding of carp dynamics, behavior, and movement that will inform effective management decisions.**

2) **Effectively BLOCK all identified carp spawning areas connected to Upper Prior & Spring Lakes.**

3) **REDUCE carp down to management goal levels in priority lakes:**

CARP MANAGEMENT GOALS:

Table 6. List of Priority Lake Management Goals for Carp

PRIORITY	WATER BODY	CURRENT CARP BIOMASS	CARP BIOMASS GOAL	TIMELINE / NOTES
#1	**Upper Prior Lake**	**259.7 kg/ha**	**< 30 kg/ha**	**Achieve goal by 2021**
#1	**Spring Lake**	**250.6 kg/ha**	**< 30 kg/ha**	**Achieve goal by 2021**
#2	*Pike Lake**	*287.2 kg/ha*	*< 100 kg/ha*	*SMSC is the lead; Achieve goal by 2022*
#2	*Arctic Lake**	*62.0 kg/ha*	*< 100 kg/ha*	*SMSC is the lead; Maintain levels*

** Note that PLSLWD takes only a supportive role in carp management.*

Previous studies demonstrate that carp biomass densities of 100 kg/ha are ecologically damaging. To effectively manage and maintain carp below this threshold, an initial reduction to a density of 30 kg/ha has been recommended for the two top priority lakes. By managing at a lower level, early detection of potential recruitment events may provide managers an opportunity to address the increase in carp population and biomass before it returns to a damaging level. Once this milestone has been achieved and recruitment has been managed, the PLSLWD may consider working towards the 30 kg/ha goal for other lakes in the District.

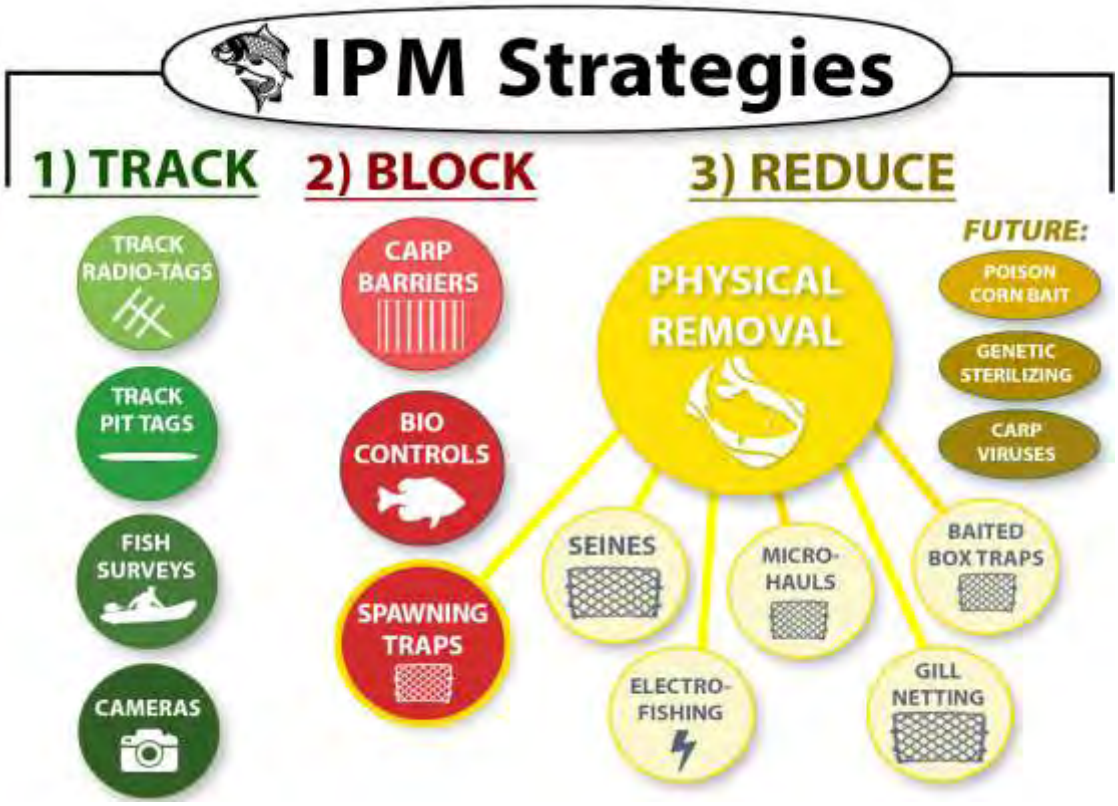
- **Goal #1: Reduce carp popuatlions to 30 kg/ha in Upper Prior Lake.**
- **Goal #2: Reduce carp populations to 30 kg/ha in Spring Lake.**

PART 5 - IPM STRATEGIES

For years after the introduction of carp in the United States, various government agencies and other entities attempted to manage and mitigate carp populations simply through large-effort mass removals. This one swing approach did not include quantifying the amount of carp before or after these efforts, or blocking carp recruitment. Without baseline carp population information, this management method proved to be ineffective as mangers were not able to quantify the extent of the invasion and did not know when they were "done". Carp often recolonized waterbodies since a long-term approach was not implemented, and spawning areas remained open and available. This management approach was largely abandoned in the late 1900s.

While commercial fishing efforts (seines) are not an effective means to control carp populations by itself, it can be a valuable component of an integrated pest management plan for long-term population management.

Ideas and strategies have since been adapted from management practices being used in Australia (Diggle et al., 2012) and by studying movement and behavior patterns of carp in the Upper Midwest. In the early-2000s the University of Minnesota Aquatic Invasive Species Research Center (MAISRC) instituted research to develop a sustainable approach to effectively mitigating and controlling common carp in the United States. This research showed that by addressing different life stages and developing an understanding of the entire system or watershed sustainable carp control could be possible. The following diagram illustrates considerations to be made in the development of a carp IPM for the Prior Lake-



5.1 TRACK

Before implementation of **BLOCK** and **REDUCE** activities, the extent of the problem needs to be addressed. There are three questions that need to be answered:

1) How many carp are in the system?
   - → *Population estimates*
   - → *Setting removal goals*

2) Where and when do carp travel and aggregate in the system?
   - → *Identify migration routes between waterbodies*
   - → *Locate areas where carp are aggregating to aid in removal efforts*

3) What basins are the carp using to spawn?
   - → *Identify potential locations for carp barriers*
   - → *Use to locate potential spawning trap locations*

A. DATA COLLECTION TOOLS & TECHNIQUES

Whatever method that is used to estimate carp populations, the first step is always to capture the carp for counting and measuring. This can be completed using a variety of methods.

COLLECTING CARP:

Electrofishing. An electric field is generated between anodes and cathodes placed in the water. The current causes muscle contraction and temporary paralysis in fish; most species will float to the surface where they can then be netted. Stunned fish usually recover quickly when the power is switched off. Unfortunately, fish in deep water are not often captured, so this technique is best used in shallower areas near the shore. Different electrofishing methods (e.g. backpack, bank-mounted and boat, including electroseining) are used depending on local site conditions. *Note: This method is also used for small scale removals.*

Gill Netting. Mesh net panels are placed vertically in the water to entangle fish. The net has a rope along the top with floats attached and another rope along the bottom with weights attached. The mesh of a gill net is uniform in size and shape and the netting is large enough for a fish to fit its head through, but not its body, trapping them in place. *Note: When employed with commercial fishermen and with permission from the MnDNR, this method is also used for larger-scale removals.*

Fyke Nets. Collapsible, cone-shaped trap nets, held open by hoops. Leader net panels or wings guide fish towards the trap entrance. Due to their size and placement in shallow locations, fyke nets are effective for catching smaller carp.

Large-Scale Removal Events. While not its main purpose, data is collected during large scale removal events to better estimate current carp populations and removal efforts. These methods include seines, baited box traps, specialized trap nets, and commercial gill netting.

After the carp have been captured, counted, and measured, they are tagged and re-released into the waterbody in order to track their movement and monitor their populations. This tagging effort is completed through a variety of tools used to track carp as listed below.

TRACKING CARP:

Passive Integrated Transponder (PIT) Tags. PIT tags act as a lifetime barcode for an individual carp and when scanned are as reliable as a fingerprint (Gibbons & Andrews 2004). The tag is usually between 10 and 14 mm long and 2 mm in diameter. PIT tags are injected with a needle or inserted by surgical incision under the skin of the fish. PIT tags are dormant until activated; they therefore do not require any internal source of power throughout their lifespan. To activate the tag, a low-frequency radio signal is emitted by a scanning device that generates a close-range electromagnetic field. The tag then sends a unique alpha-numeric code back to the reader (Keck 1994). Scanners are available as handheld, portable, battery-powered models and as stationary, automated receiver devices that are used for automated scanning. PIT tag receivers are strategically placed in suspected carp migratory routes to determine movement behaviors in those channels.

Radio-Tags. A radio-tag consists of a 2.5 inch long cylinder which is surgically inserted inside the body of the carp with a foot long antenna extending outside of its body. Unlike PIT tags, radio-tagged fish can be located manually and tracked in real-time with an antennae from a boat or from on top of the ice in winter. Radio-tags implanted in the carp should last for about three years, providing the District with key information about where the carp gather to overwinter and where they go to spawn. Each radio tag has a unique frequency, which can be picked up from up to a mile away with the tracking antennae device.

Fin Clips / Plastic Tags. In order to determine population estimates, carp are sometimes marked with a unique fin clip for the waterbody (e.g. right dorsal fin, pectoral fin, etc.) which does not harm the fish but leaves an identifiable marker. In other studies, carp have been marked with plastic tags that are inserted into the body of the fish and are similar-looking to retail clothing tags.

Figure 17. *Plastic Tag*

POPULATION ESTIMATE TECHNIQUES:

Mark-Recapture Estimate. To complete a mark-recapture estimate of abundance, captured carp will be marked with a unique mark (e.g. a fin clip, a plastic tag, a PIT tag, or a radio-tag), measured for length and weight, and released back into the basin that they were captured. Subsequent surveys will note the ratio of marked to un-marked fish and a population estimate will begin to develop using this method of estimation. This method assumes that marked carp are redistributed with the unmarked population, meaning

Figure 18. *Measuring carp*

that sufficient time (upwards of one-week) must be given between the date of marking a carp to the recapture event (Chapman, 1951). It also assumes that no emigration or immigration of the species occurs in the lake during the survey period. This method of estimation will be evaluated throughout the project period in case one or more of these assumptions is being violated.

Catch Per Unit Effort (CPUE) Survey. CPUE boat electrofishing surveys can be used to estimate carp abundance and to predict the density of adult common carp in some cases (Bajer, 2012). These surveys are completed in the late summer to early fall and over the span of one to two months. Ideally, up to three (3) separate electrofishing surveys in each lake are conducted to establish an average CPUE. Surveys will consist of at least three (3) 20-minute transects that cover shoreline and littoral zones that are suitable habitat for carp. Time spent, number of carp captured, and length and weight data are recorded. A population and biomass estimate of common carp are then calculated using this data in a CPUE model developed for using the protocol and gear described and reflects the population at the time of the survey (Bajer et al., 2012). An average of multiple surveys aims to develop a more robust estimate over a larger span of time.

Figure 19. *CPUE Survey*

B. CARP ABUNDANCE ESTIMATES

OBJECTIVE 5.1.B (1): Establish abundance estimates for each of the carp management waterbodies in the PLSLWD.

For this plan, the abundance of carp is defined as the number of individuals and the amount of biomass present within each waterbody, reported in kilograms per hectare. To determine the abundance of carp within the system, two methods have been deployed: a mark recapture population estimate and an electrofishing catch per unit effort (CPUE) model. The protocol used for these methods of estimation are described above.

As the PLSLWD implements carp management activities (removal, barriers, etc.), it will be important to monitor changes in carp abundance on these lakes to determine if these efforts are successful in suppression of carp population post-management or if adjustments to existing strategies or new strategies are necessary. See Part 3 for specific information on current populations of individual lakes.

Table 7. Carp Biomass & Phosphorus Loading in PLSLWD Carp Management Lakes

Lakes in Order of Priority	Year	Carp Biomass Estimate (kg/ha)	Estimated Total Weight (lbs)	Phosphorus Loading Rate (lbs/year)
Upper Prior Lake*	**2020**	**250.4 ± 79.1**	**87,441**	**1,431**
Spring Lake*	**2020**	**242.1 kg/ha ± 50.0**	**128,114**	**1,220**
*Pike Lake***	2020	287.2 ± 137.9	12,792	100.39
*Arctic Lake***	2018	62.0 kg/ha	1,094	7.24
Fish Lake	2019	88.7 +/- 69.2	13,886	46.89
Lower Prior Lake	2018	8.9 kg/ha	7,593	23.71
Jeffers Pond	-	*unknown*	*unknown*	*unknown*
Buck Lake	-	*unknown*	*unknown*	*unknown*

**** Carp Management Top Priority Lakes***

*** Carp Management Secondary Priority Lakes (supportive role only)*

OBJECTIVE 5.1.B (2): Develop a baseline understanding of recruitment patterns in waterbodies that connect to the two top priority lakes.

Although spawning observations can suggest areas for recruitment, the strength of these recruitment events is not known without sampling using nets or electrofishing in these basins. To help determine priority waterbodies to block movement to or from, it is recommended that steps be taken to sample basins suspected for recruitment. Radio-tags and PIT tags can be used to help document springtime movement by adults and basins can guide sampling decisions. Trap netting can be used for small sampling efforts.

Table 8. Carp Survey Status of Potential Spawning Sites Connected to Priority Lakes

Waterbody	Presence/Absence Survey	Carp Biomass Estimate (kg/ha)
Geis Wetland	Present	183.0 +/- 83.6 (2018): surveys on 8/13, 8/15, 10/4 54.3 +/- 12.1 (2019): survey on 8/15/19
Northwood Pond	Present	unknown
Tadpole Pond	Present	unknown
Charlie's Wetland	Absent	unknown

C. CARP SPATIAL USAGE

Determining how carp use the system is critical to the development of the carp IPM plan. Understanding movement patterns will allow PLSLWD staff to identify potential nursery sites, migration routes, and wintering areas where carp may be vulnerable to large scale biomass removal or blockage to movement to limit recruitment (Bajer, 2011).

To track movement, the PLSLWD has deployed several high frequency radio tags implanted in carp (Judas fish) as well as passive integrated transponder (PIT) tags with three (3) PIT tag monitoring stations. PLSLWD and WSB staff have actively tracked radio-tags using a 3-element Yagi antennae since 2015. Survey frequency was greatest during the spring spawning period (once/week) and during the winter aggregation period when ice conditions were safe enough for foot travel (once/week). The remainder of the year, radio telemetry surveys were completed on an infrequent and irregular basis.

The District has also acquired two stationary cameras to be placed at strategic locations to confirm carp migration routes and/or aggregations of carp during spawning season. These cameras are set up wirelessly and transmit real-time information so that staff can move quickly to coordinate carp removals at optimal times.

OBJECTIVE 5.1.C (1): Identify carp aggregations on Spring Lake and Upper Prior Lake

Winter-time telemetry surveys and past studies have proven that carp tend to aggregate together in large groups during the winter (Johnsen, 1977; Penne, 2008). This phenomenon allows for these aggregations to be targeted for removal using under ice netting techniques, thus the identification of carp wintering areas on Spring Lake and Upper Prior Lake was determined to be a main objective in the 2015 carp management project.

Radio-tagged carp have been periodically monitored since 2015 to identify winter carp aggregation areas that could be targeted for carp biomass removal. Three (3) distinct sites were identified, both of which commercial fishermen have been able to pull a seine net through.

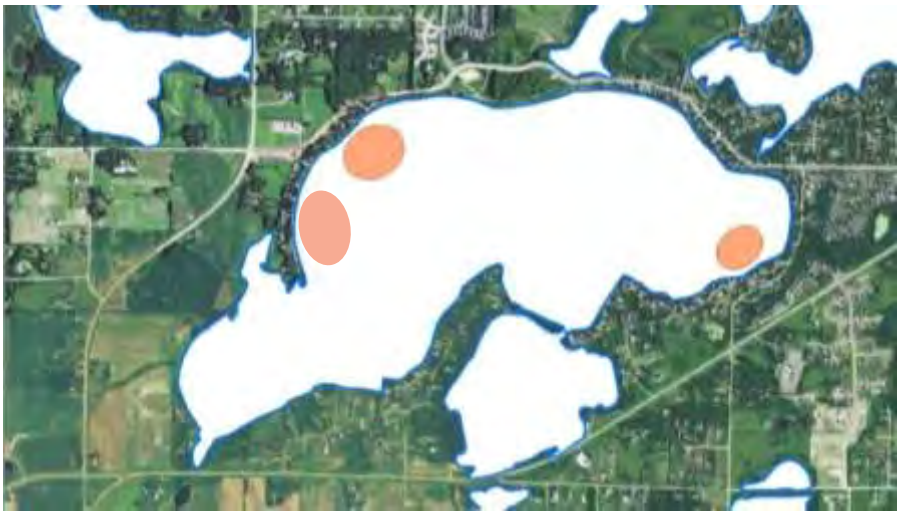


Figure 20. *Identified Spring Lake Carp Aggregation Areas Suitable to Seine*

Three full winters of telemetry data are available to identify winter aggregation areas on Upper Prior Lake and four (4) distinct sites have been identified where carp tend to aggregate, mainly

in the winter. Locations 1-3 depicted on Figure 6 have been successfully seined, but location 4 has a significant presence of rocks on the lake bottom and is not suitable for netting.

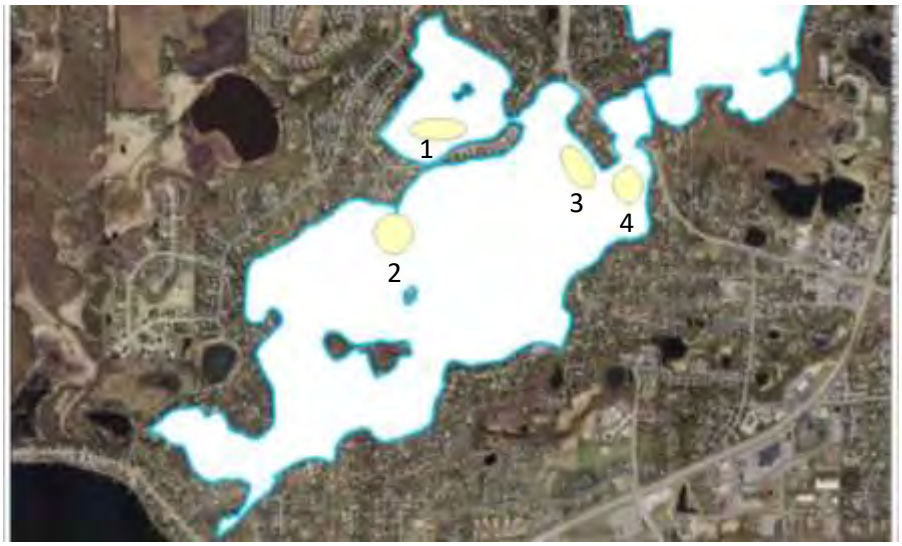


Figure 21. *2016-2020 Upper Prior Lake Carp Aggregation Areas Suitable to Seine*

Radio-tags will continued to be tracked, mapped and documented to identify new and continued areas that carp are congregating on Upper Prior and Spring Lakes.

OBJECTIVE 5.1.C (2): Visually monitor carp at spawning areas to identify aggregations at connections to Spring and Prior Lakes.

Using staff, volunteers, and stationary cameras, monitor the locations at or near Upper Prior or Spring Lakes that are suitable for small-scale carp removals when fish begin aggregating in the spring. This information will be used to coordinate electrofishing, gill-netting, micro-hauls, or seine netting carp removals with consultants and/or commercial fishermen.

OBJECTIVE 5.1.C (3): Map migration routes and identify connected nursery sites for Upper Prior and Spring Lakes.

Migration routes that allow access to shallow basins that carp exploit for use as nursery sites are the support mechanism for carp recruitment in those systems where carp spawn outside the main basins. Carp have evolved to seek out these sites since hard winters in Minnesota periodically freeze shallow basins resulting in winter-kill of most or all fish species. Absence of predator species, such as bluegill sunfish, greatly increase the chance for survival of carp eggs and larvae. Radio-tags and passive integrated transponder (PIT) tags and stationary receivers are currently being used to track the movement of carp each season (Appendix C).

Carp movement out of the Spring Lake and Upper Prior Lake system is being studied using the same radio-tags used in the Judas fish technique to find carp winter aggregations. Several apparent surface connections exist on Spring Lake and Upper Prior Lake and in some cases,

anecdotal information suggests that carp are using a connection even though no radio-tags have been detected moving. In response to this, the PLSLWD initiated a study using Passive Integrated Transponder (PIT) tags and seven (7) unmanned receivers/loggers placed in streams to detect movement and quantify the extent of movement in locations of highest priority. In addition, SMSC has their own additional PIT tag station at the outlet to Pike Lake.

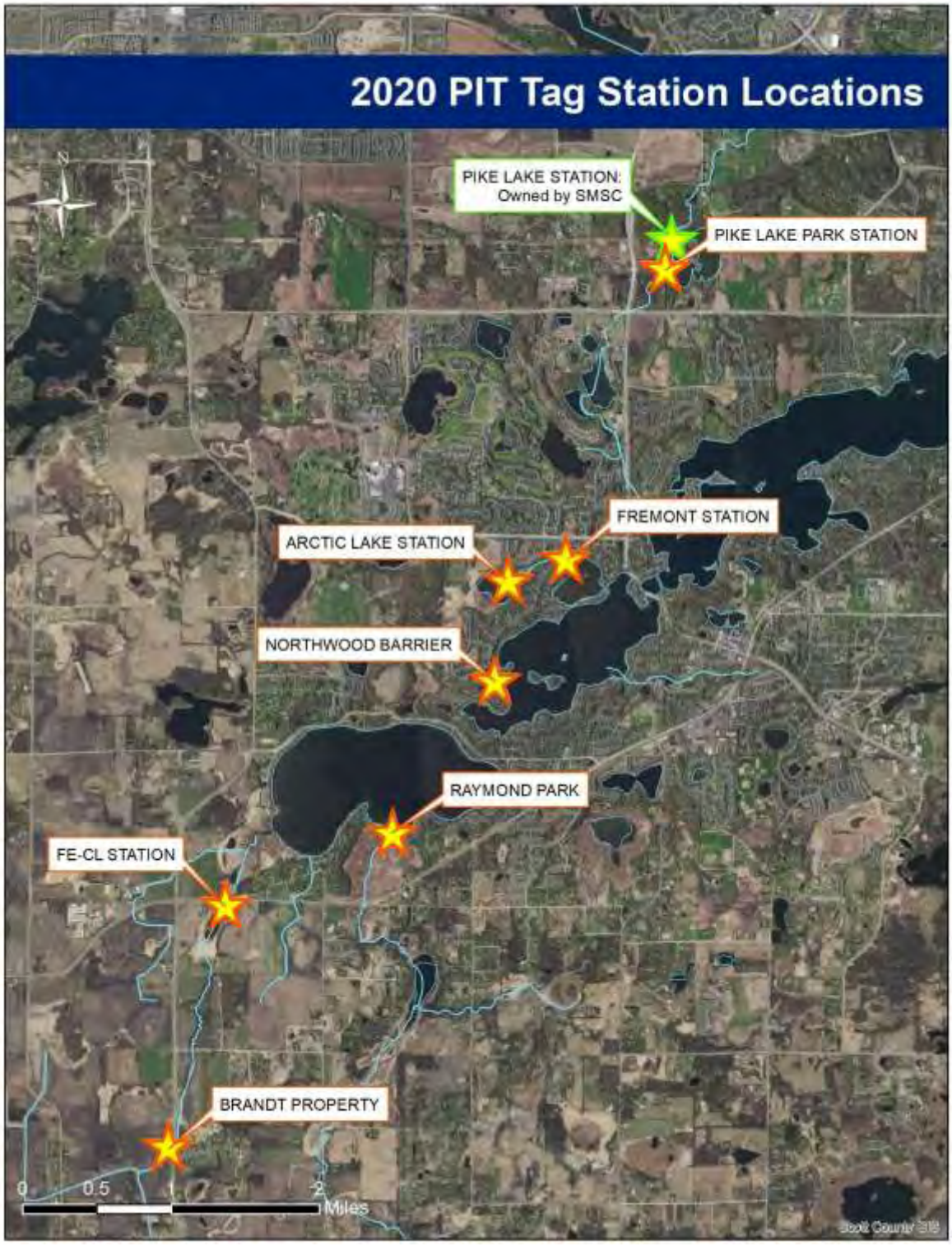


Figure 22. *PIT tag receiver locations in 2020*

Table 9. Current and future PIT tags

	Current Active PIT Tags	2020 PIT Tags	2021 PIT Tags
Upper Prior Lake	**230**	**0**	**50**
Spring Lake*	**156**	**50**	**50**
*Pike Lake***	50	0	0
Arctic Lake	26	25	0
Geis Wetland	114	0	50
Fish Lake	0	50	0

**A small amount of PIT tags were removed during recent baited box trap efforts*

Table 10. Current and future radio-tags

	Current Active Radio-Tags	2020 Radio-Tags	2021 Radio-Tags
Upper Prior Lake	**7**	**5**	**5**
Spring Lake	**8**	**5**	**5**
Arctic Lake	**6**	0	**0**
*Pike Lake***	**5**	10	**0**

***Note that SMSC is the lead on the Pike Lake carp management project.*

Tagged carp are suspected to have traveled between Upper Prior Lake and Arctic Lake after the barrier was installed in 2016. Additional PIT tags in Arctic will help confirm or deny whether or not carp are finding another way to travel between the two waterbodies.

PIT tag stations at the Northwood barrier, Arctic Lake outlet and the FeCl temporary barrier help the District verify if these barriers are sufficiently working to prevent carp migration during spawning. Spring 2020 results show that all three systems are effectively blocking movement.

5.2 BLOCK

A. BIOLOGICAL CONTROLS

Research completed by the MAISRC showed that bluegill sunfish are the main predator of carp, preying on the eggs and larvae of carp young of year. Carp actively seek out nursery sites that are devoid of these predator fish and proliferate in lakes where bluegill abundance is low. A robust panfish and gamefish population may act as biological control and compliments the other IPM strategies (Weber et al., 2012). These predator fish are necessary to prevent carp recruitment after a significant portion of the carp biomass has been removed or to keep carp from establishing in lakes.

Larger gamefish may also prey upon carp young of the year, but that relationship is not as well documented. Also, carp growth rates are quite accelerated compared to other fish species. By

the second growing season (age 1) carp may be > 12 inches, reducing the likelihood that piscivorous fish species will be able to prey upon them.

In 2017, the PLSLWD partnered with the University of Minnesota as part of a graduate reseach project to assess the effectiveness of using bluegill sunfish as biocontrol for common carp (Poole, 2018). The eastern basin at the 12/17 wetland restoration site was one of four study basins in the Twin Cities metro area used; it wasstocked with both spawning carp and adult bluegill to measure the effective rate of bluegill predation on carp eggs. The results from the study indicate that bluegill predation had a major effect on the abundance of post-larval carp. In the 12/17 wetland study basin, there 0% recruitment of carp during the study period.

OBJECTIVE 5.2.A (1): Manage lakes & upstream spawning grounds to support a robust gamefish and/or panfish population to effectively control carp recruitment.

MN DNR fisheries data is available for both Upper Prior, Lower Prior, Spring, and Fish Lakes. Two (2) independent fisheries studies have been completed on Arctic Lake, and a recent fisheries assessment was completed on Pike Lake. Existing data for these lakes show a variety of fish assemblages and abundances.

The remaining lakes (Buck Lake and Jeffers Pond) in the watershed have not been assessed. An initial sampling in Buck Lake did not indicate that it was a nursery and it had a good panfish population. Jeffers Pond is suspected to be a carp recruitment site and should be evaluated in 2021. A baseline fisheries assessment will be completed in 2022 using a variety of methodologies including electrofishing and netting. Data collected after the assessment will be used to prioritize if this lake needs to be managed.

An analysis of all existing fisheries data in 2021 will provide insights into each of the fisheries where such data is available, identify data gaps, and determine if the fishery is functioning to biologically control carp where necessary. Habitat improvements and other restorative efforts may be identified through this effort as well as waterbodies that may need additional survey work where minimal data is available.
As recommended by the PLSLWD's Citizen Advisory Committee, the PLSLWD is moving forward with its first lake fish stocking event in both Spring and Prior Lakes in 2020. With donations from the Spring Lake Association and the Prior Lake Assocation, along with a District contribution, the PLSLWD will be stocking 2,000 bluegills and 800 walleye in both Spring Lake and Prior Lake in 2020.

Table 11. 2020 Lake Fisheries Stocking Plan

	4" – 6" Bluegills	*6" – 8" Walleye*
Prior Lake	**2,000**	**800**
Spring Lake	**2,000**	**800**

OBJECTIVE 5.2.A (2): Stock bluegills as needed in carp nursery locations connected to Upper Prior and Spring Lakes to prevent recruitment.

In 2020, the PLSLWD began stocking the existing carp spawning sites at the Geis wetland and the Northwoods Pond with 2-4" bluegills in spring before carp migration and spawning. These bluegills were marked with fin-clips before releasing them into the wetland to aid in future assessment of stocking success.

While winter dissolved oxygen measurements show elevated oxygen levels (7 ppm) in the Geis wetland, which is high enough to support winter survival, it is unknown if the habitat is sufficient to support bluegill recruitment. The Geis wetland will be surveyed in the spring of 2021 to assess if the stocked bluegills survived.

Based on recommended stocking rates, the Geis wetland was stocked with 2,000 bluegills in the spring and another 500 will be stocked in the fall to reach the rate of 500 bluegill/surface acre. The Northwoods Pond site was stocked with 900 bluegills to reach the same rate. In the fall, the Tadpole Pond will also be stocked with 500 bluegill to ensure low recruitment in this nursery site.

Table 12. Summary of Bluegill Stocking in Nursery Sites

	Spring 2020 Stocking	*Fall 2020 Stocking*	*Potential 2021 Stocking*
Geis Wetland	**2,000**	**500**	**1,000**
Northwoods Pond	**900**	**0**	**500**
Tadpole Pond	**0**	**100**	**500**
Desilt Pond	**0**	**0**	**500**
Mud Bay	**0**	**0**	**500**

In 2021, the PLSLWD will assess the nursery locations for bluegill populations. More bluegills will be stocked at all three locations if deemed necessary to prevent carp recruitment. Other nursery locations will be analyzed in 2021 for potential bluegill stocking in the future.

B. CARP BARRIERS

Barriers can be an incredibly effective component of a carp IPM. Barriers may be employed to protect sensitive areas from the destructive foraging behavior of carp or prevent carp from exploiting migration routes to disrupt recruitment. Barrier placement should be balanced with the potential need for fish passage with respect to native gamefish. Placement of barriers is supported by the implementation of movement monitoring as described in section 3.1.2.

Existing carp barriers were placed throughout the Upper Prior and Spring Lake connections based on documented carp migratory information and include the following locations:

- Arctic Lake Outlet
- 12/17 Wetland (west side of Spring Lake)
- FeCl Weir (south of Spring Lake on Ditch 13)
- Desilt Pond (south of Spring Lake at Ditch 13 outlet)
- Northwoods Pond (west side of Upper Prior Lake)

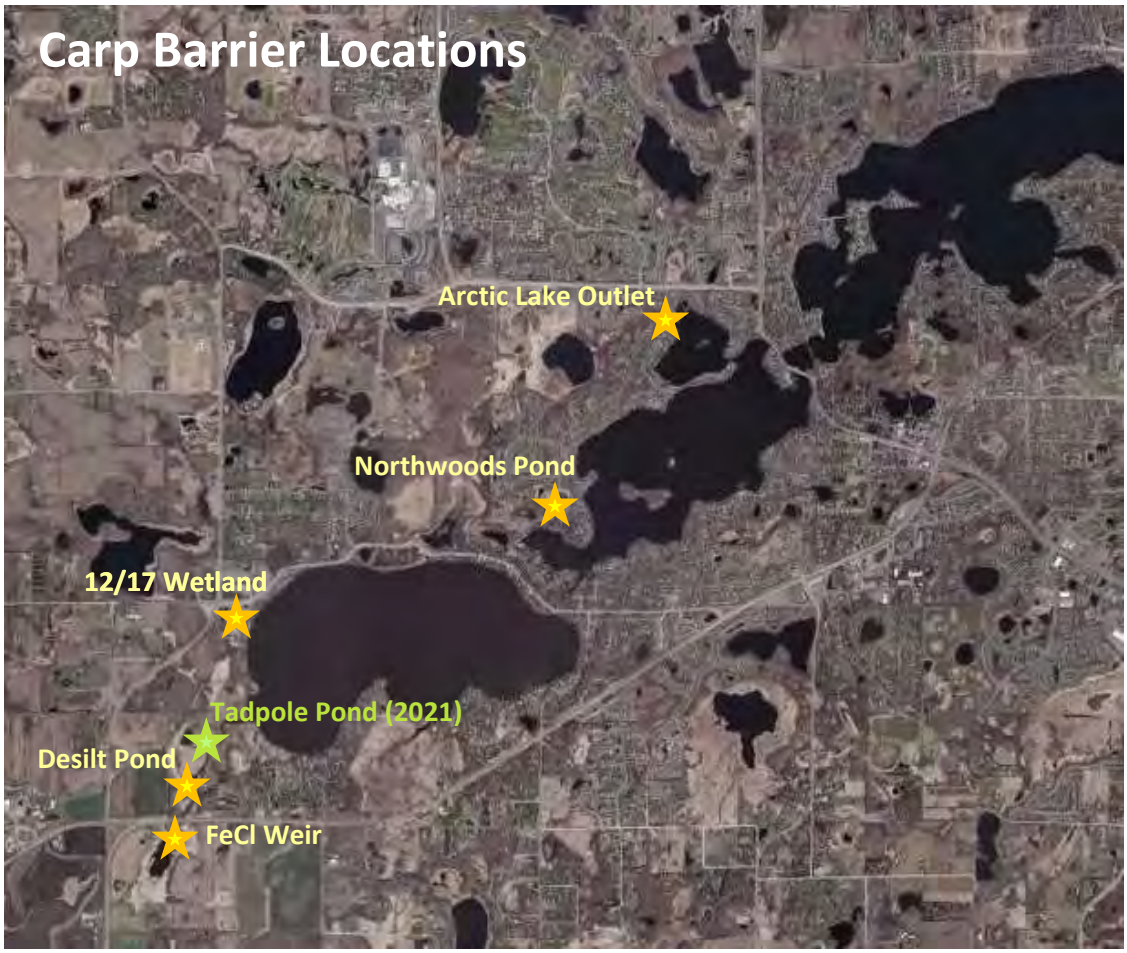


***Figure 23**. Barrier locations within the PLSLWD, including installed and proposed barrier sites.*

OBJECTIVE 5.2.B: ***Install new barriers within carp migration routes to spawning areas as documented by tracking data or fisheries assessments.***

In 2020, the PLSLWD installed one new barrier (Northwood barrier) located on the west side of Upper Prior Lake. This carp nursery site was discovered when radio-tagged carp were documented entering this waterbody during spawning season. Visual observations confirmed that it was an active spawning site.

The existing FeCl Weir barrier was also updated in 2020. This barrier system was in need of repair for nearly a decade. The new system will require less maintenance and be more effective in high water flood conditions.

The PLSLWD will be designing and building a carp barrier leading to the Tadpole Pond site for installation in 2021. Carp have been documented visiting this small waterbody to the southwest of Spring Lake during spawning season.

The PLSLWD will also continue to investigate other potential barrier locations in 2021. These locations will be identified using the tracking methods described in Section 5.1.1.

5.3 REDUCE

Carp can be removed from waterbodies using a variety of methods as documented below. PLSLWD will consider the following when deciding which removal methods to employ:

5) **Feasibility:** How likely will this method result in success? What are the obstacles?
6) **Time-Oriented:** Is immediate removal necessary to meet goal deadlines? Will the timeliness affect success of other projects (e.g. alum treatment)?
7) **Cost-Effective:** Is this method worth the cost based on anticipated results?
8) **Effort for Results:** Is this the best method for the amount of effort required? Given limitations of staff, what methods produce the greatest results for the least amount of effort?

While the IPM plan addresses the carp management strateies on a holistic, watershed-based approach, the PLSLWD is dedicated to first reaching carp management goals on its top priority carp management lakes before it works to actively manage the other six lakes.

OBJECTIVE 5.3: ***Reduce carp populations to 30 kg/ha in top priority carp management lakes: Spring and Upper Prior Lakes.***

A. CARP REMOVAL METHODS

SEINES

Commerical fishermen use long mesh nets that hang vertically in the water with floats along the top and weights along the bottom. They are typically used to surround fish in an area and pulled through the water and along the lake bottom to crib up the carp in a shallow area for removal. Both open water and under ice seine netting is very effective but limited to areas where carp aggregate and are snag free.

Figure 24. *Under Ice Seine on Spring Lake*

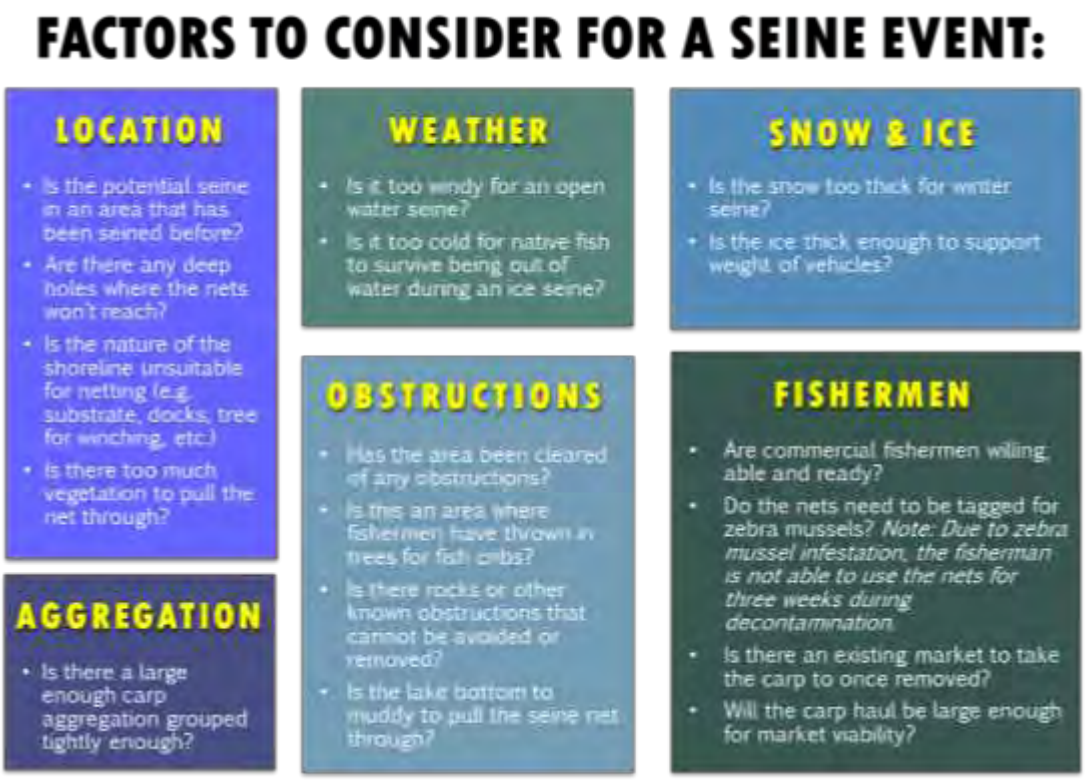


Figure 25. *Factors to Consider for a Seine Event*

Clearing Obstructions. One of the most critical factors to a successful seine is have an area that is clear of obstructions on the lake bottom. The PLSLWD can help prepare known aggregration areas prior to seine season (November – April) by engaging a commercial fishermen to run a test seine through areas with their nets, or by running a chain on the bottom of the lake. These obstruction removals will occur on Spring Lake and Upper Prior Lake each October/early November to prep the sites if a seine event is anticipated.

The PLSLWD will also use its underwater drone to check the removal area conditions prior to a seine to avoid any new or unforeseen obstructions in an area. If there are new obstructions under the ice, they can potentially be avoided or removed prior to the seine.

Upper Prior Lake Seine Net. There has been some hesitancy by commercial fishing crews to commit resources to netting Upper Prior Lake due to the presence of aquatic invasive species (Eurasian watermilfoil, curly leaf pondweed, and zebra mussels) and the DNR's requirement to decontaminate nets and associated equipment. Depending on the weather, the decontamination period may be up to 21 days, meaning that commercial crews may not have gear to net other high priority lakes/projects. The PLSLWD's seine net available for use by commercial fishermen in the District should mitigate this obstacle by providing a net that could be properly decontaminated or used repeatedly in the same waterbody while not restricting the fishing crews' ability to continuously net in other waters.

SPECIALIZED TRAP NETS

Mesh fish traps that have net guide walls leading fish into aggregation chambers. These are usually set in shallow water, and style and size can vary. The District has developed two specialized trap nets for netting during spawning season: the Push Trap Net that will include a one-way trap door panel on the opening, and the Newman Trap Net that will include multiple-staged guidance walls and openings for enhanced entrapment, both of which will be placed seasonally at carp spawning migratory routes.

Newman Cage. This design is similar to a baited box net, but rather than having to "trigger" the net by pulling up the sides to capture the carp, this net provides constant capture of carp when set. Carp swim into the trap and cannot escape. Below is an approximate version:

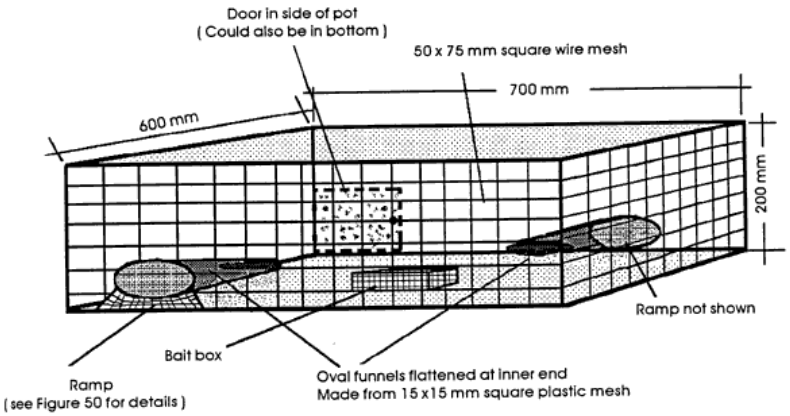


Figure 26. *Newman cage reference example.*

Push Trap. This trap takes advantage of the migratory behavior of carp as well as their propensity to "push" through barriers and is modeled conceptually on a design described in detail by Thwaites (2015). Initial laboratory results indicate that the push trap was successful in capturing 91% of adult carp in the experiment.

The design incorporates a row of PVC pipe fingers mounted on a crossbar and set at angles that allow carp to push through and swim upstream into a collection basin. The rotating fingers are similar to those mounted at the ferric chloride weir, which rotate on a fixed cylinder. The fingers are set at a height that allow for the forward or upstream movement of the fingers that "open" the trap, but the fingers cannot swing back to allow carp to exit the trap. The trap itself is composed of economical fencing materials.

***Figure 27**. Push-Trap at the Desilt Pond*

***Figure 28**. Newman Trap in Mud/Crystal Bay*

BAITED BOX TRAPS

The baited box trap is a mesh net trap that lays flat on the bottom of the lake, but quickly forms into a box when lifted to trap the carp inside. Eight solid pipes are secured around the box and ropes are run through the net and up the poles to a pulley system. Carp are typically baited with corn at the box trap location for several days with help from volunteers until a large grouping forms. While a baited box trap catches fewer fish, it holds an advantage over a seine net because the carp are much less likely to escape.

***Figure 29**. Poles visible from baited box trap.*

***Figure 30**. Deploying the baited box trap net.*

MICRO-HAULS

Micro-hauls are simply smaller removals that are completed using a variety of methods as opportunities arise. For example, using a small 500' section of a seine net called a "block net", the PLSLWD is able to complete small micro-haul events when carp group up in small areas unsuitable for seining. The removal is often assisted by electrofishing efforts, small gill nets and/or the unified sound technique to drive carp towards an area. Corn may also be used to bait an area prior to a micro-haul attempt to achieve greater removal numbers.

ELECTROFISHING

This method was further described above in Section 5.1.1.

GILL NETTING

This method was further described above in Section 5.1.1.

B. ACCELERATED STRATEGIES

OBJECTIVE 5.3.B: Develop alternative or innovative methodologies/techniques to improve or facilitate removal of carp biomass on priority carp management lakes.

In many instances carp may become aggregated, but cannot be removed in the aggregation area due to obstructions on the bottom or along the shoreline. By developing alternative removal methodology, the PLSLWD will be able to expedite carp biomass removal and in some instances, make removal possible. By developing these techniques, the PLSLWD may be able to assist other water resource management entities in addressing carp management; especially in areas where traditional methods are difficult to employ.

The unified method may provide opportunity to enhance carp removal efforts by concentrating carp using underwater speakers; essentially using sound to herd carp to a specific location or drive them from undesirable removal locations.

HERDING CARP

The underwater sound system for herding carp consists of an MP3 player wired to underwater speakers and an amplifier to "pump" sound near an aggregation to drive them into nets or herd them to an area of the waterbody that is conducive to netting. This is especially effective in an area like the northeast corner of Upper Prior Lake where rock obstructions exist near the Knotty Oar Marina, as successfully attempted during an under ice seine in 2020.

TRAINING CARP

The District is also testing the effectiveness of training carp using sound and bait. Multiple studies have shown that carp can be trained within two weeks of consistent noise and rewards and will remember this training for as long as 4-5 months afterwards. If the District can train carp to come to a location when they hear a specific noise, this could be used to create or enhance opportunities for carp removal efforts (seines, box traps, etc.).

FUTURE REMOVAL METHODS BEING STUDIED:

The Unveristy of Minnesota and other colleges are studying ways to reduce the carp population by methods other than physical removal. The PLSLWD is keeping in close contact with researchers of these programs to see if the District can participate as a test site or if there research is ready to implement. Note that the projects are likely a few years away from regulatory approval of these innovativew new methods listed below.

Poison Corn Bait. This research project is testing whether common carp can be baited and killed using corn pellets with antimycin-a, a natural fish toxin, without harming other species. Carp have a unique diet (plant seeds, such as corn, which native fish are not attracted to) and can be trained to aggregate in baited areas. Researchers first determined the concentration of antimycin-a needed and the species-specificity of the approach. They then conducted trials to test this "bait and switch" concept with carp of different sizes in experimental ponds. This research project will conclude at the end of 2021.

Genetic Sterilization. This research project is looking at introducing a synthetic species-like barrier to carp reproduction. This method involves altering the genetics of males in the invasive species (carp) before releasing them among the population, leading to sterile offspring and the eventual control of the species overall. In order to make this method usable, this study aims to develop this technology further in zebrafish, from which the system can be applied to other invasive fish species and eventually other vertebrate pests. As of July 2019, researches tested several genetic constructs in the model laboratory fish, Danio rerio., although they have not yet found a genetic design that is suitable for introduction to carp. The project will end this year, but there will be a secondary project to continue the research.

Carp Viruses. The koi herpes virus has killed off large quantities of common carp in other lakes in Minnesota, such as Lake Elysian. These die-offs lead to an interest in exploiting this carp-specific virus and introducing it into lakes infested with this invasive species. The University of Minnesota has researched the koi herpes virus, along with two other carp-killing viruses, and are in the process of researching what impacts or unintended consequences this might have on native fish. Once the virus is shown to be carp-specific and non-detrimental, there will still be a few regulatory hoops to jump through before it is allowed to be introduced into Minnesota lakes.

PART 6 - CARP MANAGEMENT SCHEDULE

The following table includes the carp activities anticipated for 2020-2021 in order to achieve the goals identified in Part 4.

CARP MANAGEMENT SCHEDULE

2020-2021

PRIOR LAKE-SPRING LAKE WATERSHED DISTRICT

TASK	START	END
TRACK: Carp Tracking & Project Development		
Implant carp with PIT tags & Radiotags	*Mar 2010*	*May 2021*
Install/monitor PIT tag reader stations	*Apr 2019*	*Sep 2021*
Track PIT & Radio tags across waterbodies	*Apr 2019*	*Dec 2021*
Update GIS location information & online maps	*Apr 2019*	*Dec 2021*
Install stationary cameras at strategic locations	*Sep 2019*	*Dec 2021*
Use underwater camera for tracking/training carp	*Sep 2019*	*Dec 2021*
Analysis: *identify aggregation areas, migration routes and population status*	*Jun 2019*	*Dec 2021*
BLOCK: Carp Barriers & Biological Controls		
Identify strategic locations for carp barriers	*Oct 2019*	*Oct 2021*
Site analysis & design of barriers	*Dec 2019*	*Mar 2021*
Install Northwood Barrier	*Sep 2019*	*Nov 2019*
Install FeCl Barrier Redesign	*Sep 2019*	*Nov 2019*
Install Barrier #2 (Tadpole Pond)	*Feb 2021*	*May 2021*
Install Barriers #3 (Location TBD)	*Apr 2020*	*May 2021*
REDUCE: Carp Removals		
Remove obstructions from seine areas	*Oct 2020*	*Apr 2021*
Spring Lake carp seines	*Nov 2019*	*Apr 2021*
Upper Prior Lake carp seines	*Mar 2019*	*Apr 2021*
Electrofishing removals	*Apr 2020*	*Apr 2021*
Micro-hauls	*Apr 2020*	*Apr 2021*
Gill Netting Pilot Project	*Mar 2020*	*Nov 2021*
Geis wetland carp removals	*Apr 2019*	*Oct 2021*
Pike Lake carp removals	*Apr 2020*	*Oct 2021*
Deploy Newman Trap in Arctic Lake outlet	*Apr 2020*	*Jun 2021*
Deploy Push Trap in desilt pond	*Apr 2020*	*Jun 2021*
Stock bluegills: Geis wetland, Northwood Pond, Tadpole	*Apr 2020*	*May 2021*
Stock bluegills & walleye in the two lakes	*May 2020*	*May 2021*
Box Trap removals with volunteers	*Apr 2020*	*Sep 2021*
Herding/training carp	*Jan 2020*	*Jan 2020*
Carp removals in other waterbodies (TBD)	*Nov 2020*	*Dec 2021*

PART 7 - SUMMARY

With the understanding that common carp play a role in the decline of water quality within the PLSLWD and with the knowledge that they are present, the goals and action items established in this plan will aid the PLSLWD in accomplishing its primary goal of managing and preserving the water resources across the watershed.

This plan is intended to be a living document; using adaptive management that may develop new management strategies and plan goals through data collection and analysis. As new data is collected and analyzed, current approaches, data collection efforts, and prioritization may change. The PLSLWD Carp IPM should be reviewed annually to provide updates to identified goals and action items and potentially add or modify goals as data collection may dictates. This plan incorporates an adaptive management approach. As data is collected and analyzed it will be used to inform the plan and possibly develop new objectives or approaches.

The PLSLWD Carp IPM has been developed as a guidance document for the management of common carp populations within the Prior Lake - Spring Lake Watershed District. The PLSLWD Carp IPM supports the goals of the 2011 Upper Prior and Spring lake TMDL and goals established for individual waterbodies throughout the watershed.

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APPENDICES

Visit the following sites online to download the appendices documents:

APPENDIX A – 2018 CLEAN WATER PARTNERSHIP GRANT FINAL REPORT
https://www.plslwd.org/wp-content/uploads/2020/09/CWP-Carp-Management-Grant-FINAL-Report_Jun-2018.pdf

APPENDIX B – ARCTIC LAKE FISHERIES ASSESSMENT 2017
https://www.plslwd.org/wp-content/uploads/2020/09/Arctic-Lake-Fisheries-Assessment_Spring2017_Final.pdf

APPENDIX C – CARP MANAGEMENT COST-BENEFIT SUMMARY 2020
https://www.plslwd.org/wp-content/uploads/2020/09/Carp-Cost-Benefit-Summary.pdf

APPENDIX D – CARP REMOVAL DATA 2016 – 2020
https://www.plslwd.org/wp-content/uploads/2020/09/PLSLWD-Carp-Removal-Data.pdf

APPENDIX E – PIKE LAKE FISHERY ASSESSMENT 2020
https://www.plslwd.org/wp-content/uploads/2020/09/Pike-Lake-Fishery-Assessment_FINAL-Report_01-2020.pdf

PLSLWD Board Staff Report
Thursday, September 10

Subject |	PERMIT #2020.01: Prior Lake Pickleball Facility		
Board Meeting Date |	September 10, 2020	**Item No**	4.3
Prepared By |	Maggie Karschnia, Water Resources Project Manager		
Attachments |	Project plans can be downloaded at https://www.plslwd.org/wp-content/uploads/2020/09/20200827-PLSLWD-Permit-submittal-Pickleball-Facility-plans.pdf.		
Proposed Motion	A motion authorizing PLSLWD staff to issue Permit #2020.01 to the City of Prior Lake, subject to the conditions listed below.		

BACKGROUND

The City of Prior Lake proposes to construct a new pickleball court, gravel parking lot, walkway and two associated stormwater basins on its property to the west of Spring Lake Regional Park near the intersection of Stemmer Ridge Road NW and CR-81 (Howard Lake Road NW).

Notice to Adjacent Landowners:

As the only landowners within 500 feet of the planned improvements are the City of Prior Lake and Scott County Parks Department, no notification to nearby residents was required. A written notice was sent to Scott County.

Note to Permit Applicant:

This report is not a permit. If the District Board approves the project, the applicant must then obtain a permit through the District staff.

Proposed Plan and Analysis:

The project was reviewed for compliance with PLSLWD's Rules for Stormwater Management (Rule D) and Erosion & Sediment Control (Rule E). The attached memo provides further details on the review by the District Engineer including findings and recommendations.

The proposed project entails:

- 1.01 acres of total impervious surface
- 0.04 acre reduction of impervious surface compared to existing conditions
- 2.60 acres of total disturbance

DISCUSSION

Watershed District Board Decision:

The application was initially received on August 27, 2020 and determined to be complete. To meet the procedural requirements of Rule B and Minnesota Statutes Section 15.99 regarding time deadlines for Board action, the Board must make a decision to either:

1) approve or deny the permit application by October 26, 2020

-or-

2) provide written notice to the applicant of an extension of the 60-day period and state the reasons for the extension and its anticipated length, which may not exceed 60 days unless approved by the applicant.

Options for Action:

1. Approve the application subject to the conditions noted herein.
2. Table the item until a future date specified and provide the applicant with direction on the issues that have been discussed.
3. Deny the application, stating the reasons for the denial.
4. Other specific actions as directed by the Board of Managers.

RECOMMENDATION

Staff Recommendation:

District staff recommends Option 1, that the project be approved subject to the application submitted, the supplemental information submitted by the applicant's engineer, and with the conditions noted below.

Action Required:

A motion authorizing PLSLWD staff to issue a permit, subject to the following conditions:

1. All recommendations identified as conditional approval items in the attached permit review by the District Engineer be addressed to the satisfaction of the PLSLWD.
2. The permittee shall obtain all other required permits and approvals.
3. The permittee shall supply the District an as-built survey of the stormwater management BMPs within 35 days of project completion. The District shall review this survey as a part of the certificate of completion for the project.
4. The District will waive the requirement for a permit fee deposit.
5. A security deposit (surety) will be required from the contractor in the amount of $2,600 prior to the issuance of the permit.
6. The permittee is responsible for the stabilization and maintenance of the adjacent areas disturbed by the construction.
7. The permittee will provide contact information for the responsible erosion control contractor prior to initiating work.


RECEIVING WATERS
PROJECT LOCATION
1-MILE BOUNDARY
Howard Lake
Campbell Lake
Spring Lake
SPRING LAKE REGIONAL PARK
PRIOR LAKE
IND RES
SCALE
FEET


EROSION CONTROL LEGEND
BOLTON & MENK
PRIOR LAKE, MN
PRIOR LAKE PICKLEBALL FACILITY
EROSION CONTROL PLAN
C2.04

Prior Lake Spring Lake Watershed District Permit Application Number 20.01

Applicant: Pete Young
City of Prior Lake
952-447-9831
pyoung@cityofpriorlake.com

Agent: Lani Leichty
Bolton & Menk, Inc.
952-890-0509
blanile@bolton-menk.com

Purpose: Construction of a new pickleball court and parking lot.

Location: Trailhead to Spring Lake Regional Park, off County Rd 82

District Rule: C, D & E

Recommendation: **Conditional approval** pending receipt of the following items:

Stormwater Management

1. Revised infiltration basin detail without rock trench extending to basin bottom, eliminating geotextile at surface, and adding specifying that knife valve should be closed under normal operation of the basins.

2. Specification of infiltration basin soil media - Typical basin cross-section calls for "Blended soil media per project specifications".

3. Revised plan including knife valve detail.

4. Increased separation (>6") between emergency overflow elevation and top of berm for infiltration basins.

5. Avoid use of fertilizer within infiltration basins - Fertilizer called out with straw blanket and seed mix 33-261 for infiltration basins.

6. Revised hydroCAD model addressing the following:
    a. Revise runoff routing to SBUH Weighting (calculating separate runoff for pervious and impervious areas).
    b. Update existing conditions curve number to brush, fair (56) instead of brush, poor (67) to be conservative on existing runoff rates.
    c. Consider using the Dynamic Storage-Indication or Storage-Indication methods for reach routing instead

of Simultaneous Routing. Simultaneous Routing is less stable than the above methods and best used for situations of reverse flow (not applicable for this project).

7. Revised stormwater management report addressing the following:
    a. Addition of Table 4.2 (curve numbers) - missing in original report.
    b. Updated high water levels for south basin in Table 4.4 - does not match hydroCAD output or design plans.
    c. Updated report tables after addressing all stormwater management comments.

Erosion and Sediment Control

8. Proof of application for NPDES permit.

Administrative

9. Letter from City indicating acceptance of maintenance responsibility for proposed stormwater management BMPs.

Conditions:

1. The permittee shall provide contact information for the responsible erosion and sediment control contractor prior to initiating work.

2. The permittee shall invite District permit inspector to preconstruction meeting.

3. The permittee shall obtain all other required permits and approvals.

4. The permittee is responsible for the stabilization and maintenance of the adjacent areas disturbed by the construction.

5. The permittee shall supply an as-built survey of stormwater management BMPs within 35 days of project completion. The District shall review this survey as a part of the certificate of completion for the project.

Exhibits:

1. Signed Permit Application dated 8/27/2020, received 8/27/2020.

2. Preliminary Plan Set and SWPPP (6 Sheets) prepared by Bolton & Menk, Inc. (BMI), received 8/27/2020.

3. Stormwater Management Report (plus HydroCAD output) prepared by BMI, dated 8/27/2020, received 8/27/2020.

4. Soils Report prepared by American Engineering Testing, Inc., dated 8/10/2020, received 8/27/2020.

5. PLSLWD Permit Application Checklist (Rules B-E), dated 8/27/2020, received 8/27/2020.

Findings:

1. Description – The project includes construction of a new pickleball facility, walkway, gravel parking lot and two infiltration basins near Spring Lake Regional Park (entrance of County Road 82). The total site area is 7.29 acres with 0.04 acres of existing impervious. The project will disturb 2.60 acres and result in 0.97 acres of new impervious, for a total of 1.01 acres of impervious surface.

2. Stormwater – Under existing conditions, stormwater runoff from the site discharges to both the north and the south. Discharge to the north is routed to an isolated wetland, while discharge to the south is routed to an existing 8" CMP culvert at the south edge of the site, eventually draining to Artic Lake. Soil borings suggest onsite soils are predominantly SC, CL and FILL (typically poor for infiltration).

   The proposed stormwater management plan includes two infiltration basins, one at the north end of the site and one at the south. Soil borings near the location of the proposed basins indicate they are excavated in FILL. Soil boring lot material descriptions of this FILL could suggest SM soils [HSG B] but without grainsize and hydrometer analysis this is only an assumption.

   These basins receive runoff from almost all impervious surfaces and have similar drainage areas to existing conditions. A small portion of the site entrance (0.05 acres impervious) cannot practicably be routed to either basin and discharges via overland flow the north wetland. These basins infiltrate all runoff from the site for the 2-year, 24-hour storm event satisfying District Rule D.3(c) and (f) [volume control and water quality treatment criteria]. Runoff leaving the site is reduced for the 2-, 10-, and 100-year, 24-hour storm events satisfying District Rule D.3(b) [rate control criteria]. The infiltration basins also include 4" underdrains to help drain the basins while vegetation is establishing and in the event the basins do not perform as expected allowing operation and performance as filtration basins.

Pretreatment to the infiltration basins is provided by a grass buffer from the pickleball courts (4') and parking lot (2').

Comments on the stormwater management plan will have to be addressed to confirm the project still meets District rules after necessary changes.

3. Erosion & Sediment Control – Both the SWPPP and an erosion control plan have been provided. The plan includes silt fence downstream of disturbed areas, a rock construction entrance, erosion control blanket, revegetation specifications and a construction sequencing notes.

4. Floodplain – There is no floodplain onsite.

5. Buffer Strips – There is one wetland north of the site, which is roughly 107 feet from the edge of project disturbance. This project does not trigger the District Rules for wetland alterations (Rule G) or buffer strips (Rule J).

PRIOR LAKE - SPRING LAKE
WATERSHED DISTRICT

Prior Lake - Spring Lake Watershed District (PLSLWD)

4646 Dakota Street SE, Prior Lake, MN 55372, 952-447-4166

PERMIT APPLICATION, PAGE 1 OF 2

Note to Applicant: use this as the cover sheet for your application materials.

PROJECT NAME
Prior Lake Pickleball Facility

APPLICATION #: (to be assigned)

Name of Owner - Applicant **Phone #:** 952-447-9800
City of Prior Lake **Fax #:** 952-447-4245

Address of Owner - Applicant (Street, City, State, Zip Code)
4646 Dakota St. SE Prior Lake, MN 55372

Project Location (Township, Range, Section), PIDs, and Address
T114, R22, S4 - PID: 259040041

Project size (acres)
2.6 acres

Owner's Agent/Engineer:
Name Lani Leichty
Phone 952-890-0509
E-mail lanile@bolton-menk.com

Owner's Contact:
Name Pete Young
Phone 952-447-9831
E-mail pyoung@cityofpriorlake.com

PERMIT CATEGORY (check applicable type(s))

- ☒ Land Disturbance (C)
- ☒ Stormwater Mgt (D)
- ☒ Erosion & Sediment Ctrl (E)
- ☐ Floodplain Alteration (F)
- ☐ Wetland Alteration (G)
- ☐ Bridge & Culvert Crossings (H)
- ☐ Drainage Alteration (I)
- ☐ Buffer Strips (J)
- ☐ Other:_____

PROJECT DESCRIPTION

This project involves the construction of a pickleball court and parking lot for the City of Prior Lake. The facility is located near Spring Lake Regional Park.

GENERAL CONDITIONS

1. The Permittee grants to the District, and its agents, employees, officers and contractors, a license to enter the Project to perform any inspections or work authorized by the Permit or any applicable law. This license shall expire after acceptance of the work by the District and issuance of a Certificate of Completion.

2. The Permittee shall indemnify, defend and hold the District and its agents, employees and officers harmless for all claims made by itself and third parties for damages or loss sustained or costs incurred, including engineering and attorneys' fees, as a result of issuance of the Permit or construction of the Project.

3. The Permittee shall provide the District with a Permit Fee Deposit in accordance with District requirements (see page 2). The Permit Fee Deposit will be held in escrow and used by the District to pay the actual costs incurred by the District, including engineering and legal fees, to process and review the Permit Application, to inspect and monitor the activities authorized by the Permit, and to ensure compliance with the District's rules. The Permittee shall fully pay all bills submitted to it by the District within seven days of receipt. Bills not so paid shall accrue interest at the rate of 8% per year.

4. The Permittee shall obtain such easements as may be required for construction of the Project and provide in the final plat for the Project utility and drainage easements acceptable to the District to protect all hydrologic features within the Project and to provide access for the maintenance of the stormwater management facilities to be constructed pursuant to the Permit.

5. To assure full compliance with the terms of the Permit, the Permittee shall deposit with the District a cash security or irrevocable letter of credit in a form and from a surety satisfactory to the District, in the amount specified under the Special Conditions of the Permit, once issued.

6. By acceptance of the Permit, Permittee acknowledges and agrees to perform and be bound by all general and special terms and conditions of the Permit.

CONTINUED ON NEXT PAGE

PRIOR LAKE - SPRING LAKE
WATERSHED DISTRICT

PERMIT APPLICATION, PAGE 2 OF 2

Prior Lake - Spring Lake Watershed District (PLSLWD)
4646 Dakota Street SE, Prior Lake, MN 55372, 952-447-4166

PROJECT NAME	APPLICATION #: (to be assigned)
Prior Lake Pickleball Facility	

Permit Fee Deposit - to be paid with your application:

Instructions: Calculate the required Permit Fee Deposit by totaling the amounts from items A through D below (as applicable). Include the Permit Fee Deposit with your application. Checks may be payable to the Prior Lake-Spring Lake Watershed District.

			Fill in amount here:
A) Grading or Alteration:			
less than one acre	$500		
1.0 to 4.99 acres	$1,000		
5.0 to 19.9 acres	$1,500		
20 acres or more	$2,000		
B) Projects with Wetland or Flood Plain Areas	$1,000	+	
C) Bridge or Culvert Crossing of a Waterbody or Ditch	$1,500 per crossing	+	
D) Drainage Alterations	$1,500	+	
Total Permit Fee Deposit due with application		=	NA

Permit Fee Deposit information and conditions:

1. The Permit Fee Deposit will be held in escrow and used to pay the District's costs for reviewing the application and administering the permit (if approved), including staff costs, and engineering and legal fees.

2. If at any time the Permit Fee Deposit falls below 25% of the original amount, the District shall notify the applicant to replenish the fee deposit to the original amount.

3. Upon application approval, a separate permit security escrow shall be required from the applicant prior to permit issuance.

4. Upon final completion of the project and the issuance of a Certificate of Completion by the District, the District shall return any unspent balance in the Permit Fee Deposit to the applicant, less a $10 application fee. The District does not pay interest on escrow deposits.

I hereby apply under District Rule B for a permit to complete the proposed project in accordance with the information submitted with this Application and the District's Rules, and I agree to the conditions on page one and two of this application.

Signature of Owner - Applicant	Your Name - please print	Date Submitted
	Pete Young	8/27/2020

Application Received	Permit Fee Deposit Amt	Received (y/n)	District Representative

Prior Lake Spring Lake Watershed District Permit Application Number 20.01

Applicant: Pete Young
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Agent: Lani Leichty
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STORM WATER MANAGEMENT REPORT

PRIOR LAKE PICKLEBALL FACILITY

CITY OF PRIOR LAKE

Scott County, MN

T18. 122360

BOLTON & MENK

Real People. Real Solutions.

August 27, 2020

PRIOR LAKE
PICKLEBALL FACILITY

STORM WATER MANAGEMENT REPORT

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Lanol L. Leichty, P.E.

Date: August 27, 2020

License #: 20846

Bolton & Menk, Inc.
12224 Nicollet Avenue
Burnsville, MN 55337
(952) 890-0509

TABLE OF CONTENTS

1.0 INTRODUCTION AND BACKGROUND

1.1 Project Background

The proposed Prior Lake Pickleball Facility is to be constructed on a 57.99 acre parcel, located in the Spring Lake Regional Park. The parcel is owned by the City of Prior Lake. This plan, prepared by Bolton & Menk, Inc. (BMI) is to document the basis of the storm water management design for the Prior Lake Pickleball Facility to meet the Prior Lake Spring Lake Watershed District storm water management requirements.

1.2 Data Used

The following data was used in this analysis:

- Aerial Imagery (MnGeo WMS Service, 2016 7-county)
- Existing Topography (Survey & MnTOPO, 2013)
- NOAA Atlas-14 Precipitation Data

2.0 STORMWATER MANAGEMENT REQUIREMENTS

2.1 Prior Lake Spring Lake Watershed District

The site is located within the Prior Lake Spring Lake Watershed District (PLSLWD). For City led projects the City of Prior Lake follows the PLSLWD standards. The stormwater standards used in the design of the resource management plan are:

- Runoff from development or redevelopment shall not exceed the existing 2-, 10-, and 100-year, 24-hour stormwater events.
- An on-site soils report shall be used to determine hydrologic soil groups.
- Retain the runoff volume generated on the site by the 2-year, 24-hour event under the developed condition for all points where discharges leave a site. For that portion of the 2-year, 24-hour event runoff volume that is not required to be infiltrated under paragraph, water quality BMPs or additional infiltration shall be incorporated.

Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency (MPCA) regulates stormwater runoff by administering the National Pollution Discharge Elimination System (NPDES) Permit. The NPDES Permit is required for any projects that disturb more than one (1.0) acre of area. The permanent stormwater management requirements of the Permit are triggered if the project proposes to increase the impervious surface area by more than one acre.

The overall project disturbance is over one acre; therefore, a Stormwater Pollution Prevention Plan (SWPPP) was prepared and a NPDES Permit will be obtained through the MPCA. The proposed BMP(s) must be capable of retaining on site one (1) inch of runoff from the new impervious surfaces created by the project, which is less than that required by the Prior Lake Spring Lake Watershed District.

3.0 METHODOLOGY

3.1 Hydrology

The site was analyzed using HydroCAD for pre- and post-development conditions. Runoff generation was estimated using TR-20 methodology. NOAA Atlas 14 rainfall depths and nested distributions using MSE-3 rainfall distribution was used for the analysis. Runoff from pervious and impervious areas were calculated separately. Table 3.1 summarizes the rainfall depths that were used in the analysis.

Table 3.1 Summary of NOAA Atlas 14 Rainfall Depths (inches)

Rainfall Duration	2-Year	10-Year	100-Year
24 Hours	2.84	4.22	7.39

Time of concentration (TC) for existing conditions were calculated using the TR-55 methodology. Curve numbers were selected for each subwatershed based on the land use, soil conditions and impervious surface area. These parameters were used to select the appropriate CN using TR-55 methodology.

3.2 Hydraulics

Hydraulic routing within HydroCAD was computed using the Sim-Route methodology.

4.0 ANALYSIS AND RESULTS

4.1 Existing Conditions

4.1.1 Site Topography

Topography across the site is generally rolling with elevations between 995± and 977±. The site consists of a gravel parking lot and entrance road and a bituminous trail.

4.1.2 Soils

A soils report was prepared by American Engineering Testing, Inc. Soil boring #4 is located near the proposed southerly infiltration basin and soil boring #5 is located near the northerly infiltration basin. The soils report classifies the soils in soil boring #4 as mostly silty sand within the upper 4.5-feet. The soils in soil boring #5 were classified as silty sand, clayey sand, and a mixture of a little gravel within the upper 7-feet. These are considered to be Hydrologic Soil Group (HSG) Type B soils. A conservative infiltration rate of 0.3-in/hr was used for sizing the infiltration basins with a water quality pool depth of 12-inches. The soil information for the site is provided in ***Appendix A***.

No groundwater was encountered in either Soil Boring #4 or #5.

4.1.3 Land Use

The existing land use consists of a gravel entrance road into the park and a mixture of brush/meadow in the area of the proposed improvements.

4.2 Proposed Conditions

4.2.1 Site Topography

The existing drainage patterns will try to be maintained as close as possible. The southern portion of the site will drain into a proposed infiltration basin, where the overflow will outlet through a culvert and drain to the south. The northern catchment will drain into an infiltration basin where it will be infiltrated and overflow through a culvert and drain to an isolated wetland.

4.2.2 Land Use

The site will be developed into a pickleball facility, with a gravel parking lot. Weighted CN values for each subwatershed were derived based on the following CN values provided in Table 4.2. The developed area within the lots was assumed to be open space with >75% grass cover.

The total disturbed area is approximately 5.9 acres (without offsite drainage areas), of which 0.97 acres is new impervious.

,

Figure 3 shows the proposed stormwater feature location and drainage areas.

4.3 Basin Summary and Routing

There will be two onsite infiltration basins for water quality purposes and rate control. Table 4.3 summarizes the performance of the basins and associated water levels.

Table 4.3 Basin HWL Summary

Basin	100-Yr HWL (ft)
North Basin	988.6
South Basin	983.0

4.4 Rate Control

The development site was analyzed to determine the pre- and post-development runoff rates. The City standards require that the proposed runoff rates may not exceed existing rates for the 2-, 10-, and 100-year, 24-hours storms. The existing and proposed runoff rates are summarized in Table 4.4 See Appendix B for the pre- and post-development HydroCAD summaries.

Table 4.4 Summary of Site Peak Discharge Rates (cfs)

1L North Runoff	**2-Year**		**10-Year**		**100-Year**	
	Rate (cfs)	Elevation-1P	Rate (cfs)	Elevation-1P	Rate (cfs)	Elevation-1P
Existing	0.4	NA	1.2	NA	3.6	NA
Proposed	0.2	987.8	0.4	988.1	1.3	988.6

2P South Basin	**2-Year**		**10-Year**		**100-Year**	
	Rate (cfs)	Elevation	Rate (cfs)	Elevation	Rate (cfs)	Elevation
Existing	0.6	NA	1.7	NA	5.0	NA
Proposed	0.0	982.83	0.2	983.23	2.8	983.92

4.5 Water Quality Calculations

The PLSLWD standards require permanent stormwater quality management be provided in accordance with the NPDES General Construction Permit No: MN R100001 (as amended). This involves providing a water quality runoff volume from a 2-year storm event over the developed condition. Pretreatment of runoff prior to discharging into the infiltration basins will be accomplished by the use of grass buffers and overland flow.

Table 4.5 Water Quality Volume Summary

Pickleball Facility	**2-year Runoff Volume**
	(ac. ft.)
North Basin	0.088
South Basin	0.080
Total	0.168

The infiltration basins have been designed to capture the entire 2-yr, 24-hr runoff volume with no discharge by using a raised culvert.

Drawdown Time

The soil borings in the area of the proposed infiltration basins show a silty sand soil type, which corresponds to a Hydrologic Soil Group (HSG) B soil with a Unified Soil Classification of SM. The Minnesota Stormwater Manual recommends using an infiltration rate of 0.3”/hr to 0.45”/hr for this soils type. A conservative infiltration rate of 0.3”/hr was used for each infiltration basin with a water quality volume depth of 3.5-inches for Infiltration Basin #1 and 9.8” for Infiltration Basin #2. The required water quality drawdown time for the filtration basins is 48 hours. Using this rate results in a drawdown time of 11.6 hours for Infiltration Basin #1 and 32.7 hours for Infiltration Basin #2.

A drain tile system has been added to each infiltration basin as a backup in case the soils become plugged with silt or do not perform as expected. This will allow the City to operate each basin as a filtration system.

Each basin has been sized for Phase 1 of this project. The timing of future Phase 2 is unknown at this time. When Phase 2 does occur the improvements will be sized to the Watershed District standards that are current at that time.

PROJECT LOCATION MAP

FIGURE 1

HORZ. 0 25 50
SCALE FEET

FIGURE 2

EXISTING DRAINAGE MAP

HORZ. SCALE 0 25 50 FEET

PROPOSED DRAINAGE MAP

FIGURE 3

APPENDIX A

Soils Report

AMERICAN ENGINEERING TESTING, INC.	**PROJECT** Spring Lake Regional Park Improvements	**PREPARED BY** MN
	LOCATION Prior Lake, Minnesota	**AET NO.** 20-22959
	SUBJECT Final SPT Boring Locations	**DATE** August 10, 2020

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-22959** Log of Boring No. **1 (p. 1 of 1)**

Project: **Sprint Lake Regional Park Improvements; Prior Lake, MN**

DEPTH IN FEET	Surface Elevation **983.0** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, trace roots, brown	FILL	8	M	SS	15					
2											
3	CLAYEY SAND, a little gravel, brown, stiff (SC)	TILL	11	M	SS	14	26				
4											
5											
6			14	M	SS	18	26				
7											
8			14	M	SS	20	17				
9											
10											
11			13	M	SS	20	19				
	END OF BORING										

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½'	**3.25" HSA**							
BORING COMPLETED:	**8/5/20**							
DR: **TA**	LG: **JJ** Rig: **69C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 20-22959.GPJ AET+CPT+WELL_20181012_JG.GDT 8/11/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-22959** Log of Boring No. **2 (p. 1 of 1)**

Project: **Sprint Lake Regional Park Improvements; Prior Lake, MN**

DEPTH IN FEET	Surface Elevation **983.3** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly clayey sand, trace roots, brown	FILL	6	M	SS	15	17				
2											
3	SANDY LEAN CLAY, a little gravel, brown, firm to stiff (CL)	TILL	7	M	SS	14	28				
4											
5											
6			11	M	SS	18	22				
7											
8	CLAYEY SAND, a little gravel, brown, stiff to very stiff (SC)		11	M	SS	9	24				
9											
10											
11			18	M	SS	20	21				
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-9½' 3.25" HSA							
BORING COMPLETED: **8/5/20**							
DR: **TA** LG: **JJ** Rig: **69C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 20-22959.GPJ AET+CPT+WELL_20181012_JG.GDT 8/11/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-22959** Log of Boring No. **3 (p. 1 of 1)**

Project: **Sprint Lake Regional Park Improvements; Prior Lake, MN**

DEPTH IN FEET	Surface Elevation **978.0** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly clayey sand with organic fines, trace roots, dark brown	FILL	8	M	SS	16	23				
3	SANDY LEAN CLAY, trace roots, brown, firm (CL)	TILL	7	M	SS	19	24				
5	CLAYEY SAND, a little gravel, stiff to firm, brown (SC)		11	M	SS	18	29				
8			8	M	SS	19	20				
10	SILTY SAND, fine grained, brown, wet, loose (SM)	COARSE ALLUVIUM	8	M	SS	20					
13	SANDY LEAN CLAY, a little gravel, firm, brown (CL)	TILL	6	M	SS	17	32				
	END OF BORING										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-12½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
	8/5/20	**9:47**	**14.5**	**12.5**	**13.9**		**12.7**	
	8/5/20	**9:59**	**14.5**	**12.5**	**13.5**		**11.5**	
BORING COMPLETED: **8/5/20**								
DR: **TA** LG: **JJ** Rig: **69C**								

AET_CORP 20-22959.GPJ AET+CPT+WELL_20181012_JG.GDT 8/11/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-22959** Log of Boring No. **4 (p. 1 of 1)**

Project: **Sprint Lake Regional Park Improvements; Prior Lake, MN**

DEPTH IN FEET	Surface Elevation **987.0** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, trace roots, brown	FILL	13	M	SS	1					
2											
3			12	M	SS	15					
4											
5	CLAYEY SAND, a little gravel, light brown, stiff (SC)	TILL	9	M	SS	16	17				
6											
7											
8			13	M	SS	15	15				
9											
10			15	M	SS	22	21				
11	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-9½' 3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
BORING COMPLETED: **8/5/20**								
DR: **TA** LG: **JJ** Rig: **69C**								

AET_CORP 20-22959.GPJ AET+CPT+WELL_20181012_JG.GDT 8/11/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **20-22959** Log of Boring No. **5 (p. 1 of 1)**

Project: **Sprint Lake Regional Park Improvements; Prior Lake, MN**

DEPTH IN FEET	Surface Elevation **982.8** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand, trace roots, brown	FILL	9	M	SS	16					
3	FILL, mixture of clayey sand and silty sand, a little gravel, brown		11	M	SS	16	15				
6			12	M	SS	15	20				
8	CLAYEY SAND, a little gravel, brown to gray, stiff to very stiff (SC)	TILL	14	M	SS	20	18				
11			14	M	SS	20	17				
13			29	M	SS	22	14				
14	**END OF BORING**										

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS						
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-12½' 3.25" HSA							
BORING COMPLETED: **8/5/20**							
DR: **TA** LG: **JJ** Rig: **69C**							

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 20-22959.GPJ AET+CPT+WELL_20181012_JG.GDT 8/11/20

APPENDIX B

HydroCAD Summaries

(Pre- and Post-Development)

Subcat Reach Pond Link

Routing Diagram for Existing Condition
Prepared by Bolton & Menk Inc, Printed 8/26/2020

Summary for Subcatchment 1S: North Area

Runoff = 0.43 cfs @ 12.37 hrs, Volume= 0.038 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Yr Rainfall=2.84"

	Area (sf)	CN	Description
	37,364	67	Brush, Poor, HSG B
*	1,567	96	Gravel Road
	38,931	68	Weighted Average
	38,931		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	176	0.0250	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.85"

Summary for Subcatchment 2S: South Area

Runoff = 0.56 cfs @ 12.51 hrs, Volume= 0.060 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Yr Rainfall=2.84"

Area (sf)	CN	Description
67,634	67	Brush, Poor, HSG B
67,634		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	300	0.0330	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.85"

Summary for Subcatchment 1S: North Area

Runoff = 1.22 cfs @ 12.34 hrs, Volume= 0.094 af, Depth> 1.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Yr Rainfall=4.22"

	Area (sf)	CN	Description
	37,364	67	Brush, Poor, HSG B
*	1,567	96	Gravel Road
	38,931	68	Weighted Average
	38,931		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	176	0.0250	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.85"

Summary for Subcatchment 2S: South Area

Runoff = 1.67 cfs @ 12.46 hrs, Volume= 0.155 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Yr Rainfall=4.22"

Area (sf)	CN	Description
67,634	67	Brush, Poor, HSG B
67,634		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	300	0.0330	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.85"

Summary for Subcatchment 1S: North Area

Runoff = 3.57 cfs @ 12.32 hrs, Volume= 0.264 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Yr Rainfall=7.39"

	Area (sf)	CN	Description
	37,364	67	Brush, Poor, HSG B
*	1,567	96	Gravel Road
	38,931	68	Weighted Average
	38,931		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.7	176	0.0250	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.85"

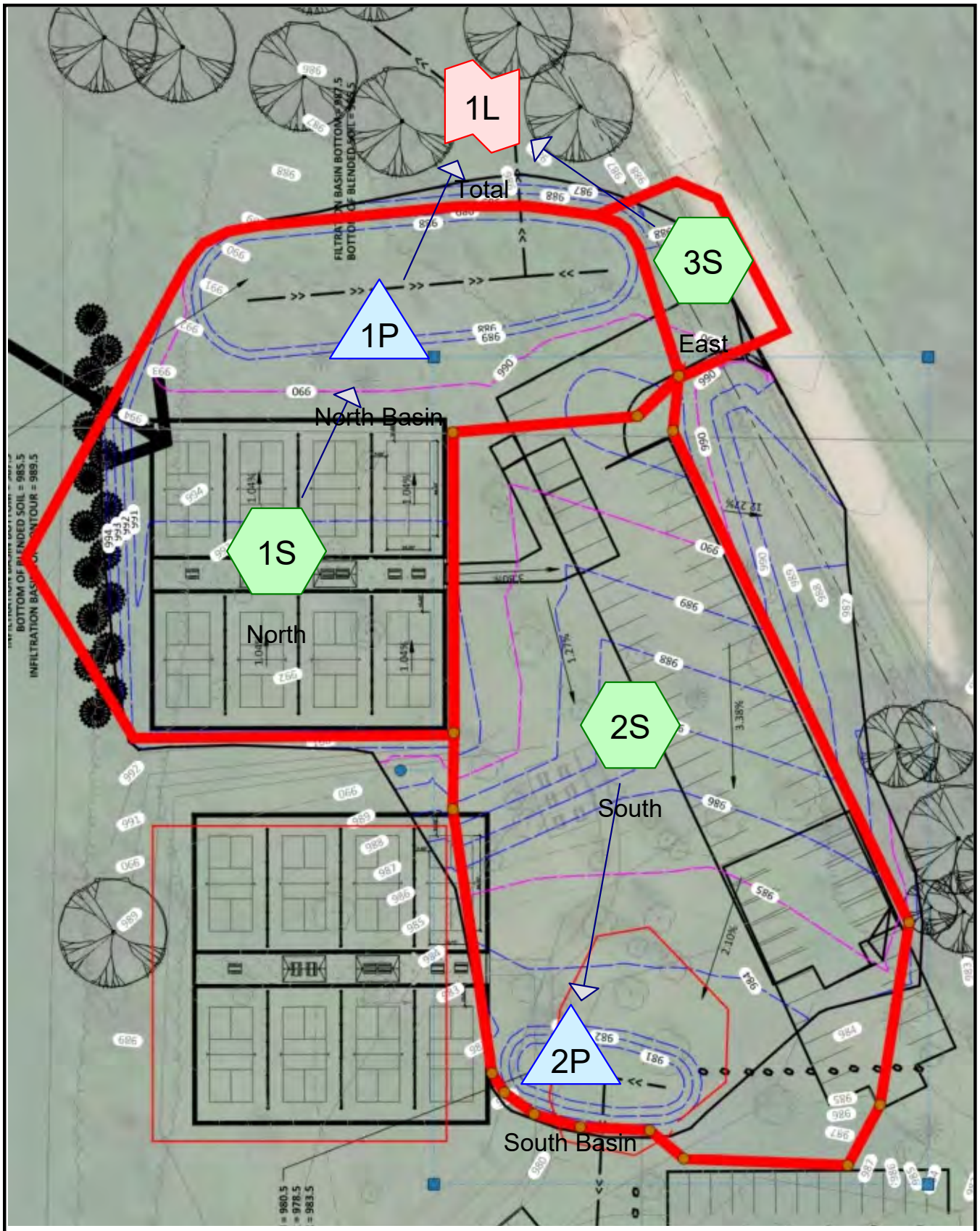
Summary for Subcatchment 2S: South Area

Runoff = 5.02 cfs @ 12.43 hrs, Volume= 0.445 af, Depth> 3.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Yr Rainfall=7.39"

Area (sf)	CN	Description
67,634	67	Brush, Poor, HSG B
67,634		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	300	0.0330	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.85"



Routing Diagram for Proposed Pickleball Ct
Prepared by Bolton & Menk Inc, Printed 8/26/2020
HydroCAD® 10.00-24 s/n 01030 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment 1S: North

Runoff = 1.68 cfs @ 12.19 hrs, Volume= 0.088 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 yr Rainfall=2.85"

Area (sf)	CN	Description
21,898	98	Unconnected pavement, HSG C
25,816	61	Pasture/grassland/range, Good, HSG B
47,714	78	Weighted Average
25,816		54.11% Pervious Area
21,898		45.89% Impervious Area
21,898		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment 2S: South

Runoff = 1.52 cfs @ 12.18 hrs, Volume= 0.080 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 yr Rainfall=2.85"

Area (sf)	CN	Description
18,918	98	Unconnected roofs, HSG C
35,682	61	Pasture/grassland/range, Good, HSG B
54,600	74	Weighted Average
35,682		65.35% Pervious Area
18,918		34.65% Impervious Area
18,918		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	41	0.0240	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.84"
2.2	175	0.0370	1.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	216	Total			

Summary for Subcatchment 3S: East

Runoff = 0.23 cfs @ 12.12 hrs, Volume= 0.010 af, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2 yr Rainfall=2.85"

Area (sf)	CN	Description
2,280	98	Unconnected pavement, HSG C
1,545	65	Brush, Good, HSG C
3,825	85	Weighted Average
1,545		40.39% Pervious Area
2,280		59.61% Impervious Area
2,280		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	34	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.84"
0.7	21	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	55	Total			

Summary for Pond 1P: North Basin

Inflow Area = 1.095 ac, 45.89% Impervious, Inflow Depth > 0.97" for 2 yr event
Inflow = 1.68 cfs @ 12.19 hrs, Volume= 0.088 af
Outflow = 0.06 cfs @ 15.13 hrs, Volume= 0.043 af, Atten= 96%, Lag= 176.4 min
Discarded = 0.06 cfs @ 15.13 hrs, Volume= 0.043 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 987.79' @ 15.13 hrs Surf.Area= 8,790 sf Storage= 2,499 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 142.2 min (942.8 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	987.50'	19,950 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.50	8,272	0	0
988.00	9,156	4,357	4,357
989.00	11,001	10,079	14,436
989.50	11,056	5,514	19,950

Device	Routing	Invert	Outlet Devices
#1	Discarded	987.50'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	988.00'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 988.00' / 987.00' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	988.65'	**4.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.06 cfs @ 15.13 hrs HW=987.79' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=987.50' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: South Basin

Inflow Area = 1.253 ac, 34.65% Impervious, Inflow Depth > 0.77" for 2 yr event
Inflow = 1.52 cfs @ 12.18 hrs, Volume= 0.080 af
Outflow = 0.03 cfs @ 19.49 hrs, Volume= 0.017 af, Atten= 98%, Lag= 439.0 min
Discarded = 0.03 cfs @ 19.49 hrs, Volume= 0.017 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 981.82' @ 19.49 hrs Surf.Area= 3,683 sf Storage= 2,745 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 146.6 min (954.5 - 807.9)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	10,232 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	2,986	0	0
982.00	3,832	3,409	3,409
983.00	4,779	4,306	7,715
983.50	5,290	2,517	10,232

Device	Routing	Invert	Outlet Devices
#1	Discarded	981.00'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	981.85'	**15.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 981.85' / 981.00' S= 0.0425 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Primary	983.10'	**4.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.03 cfs @ 19.49 hrs HW=981.82' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=981.00' (Free Discharge)
├**2=Culvert** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Total

Inflow Area = 1.183 ac, 46.91% Impervious, Inflow Depth > 0.10" for 2 yr event
Inflow = 0.23 cfs @ 12.12 hrs, Volume= 0.010 af
Primary = 0.23 cfs @ 12.17 hrs, Volume= 0.010 af, Atten= 0%, Lag= 3.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Subcatchment 1S: North

Runoff = 3.45 cfs @ 12.18 hrs, Volume= 0.181 af, Depth> 1.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 yr Rainfall=4.23"

Area (sf)	CN	Description
21,898	98	Unconnected pavement, HSG C
25,816	61	Pasture/grassland/range, Good, HSG B
47,714	78	Weighted Average
25,816		54.11% Pervious Area
21,898		45.89% Impervious Area
21,898		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment 2S: South

Runoff = 3.48 cfs @ 12.17 hrs, Volume= 0.176 af, Depth> 1.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 yr Rainfall=4.23"

Area (sf)	CN	Description
18,918	98	Unconnected roofs, HSG C
35,682	61	Pasture/grassland/range, Good, HSG B
54,600	74	Weighted Average
35,682		65.35% Pervious Area
18,918		34.65% Impervious Area
18,918		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	41	0.0240	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.84"
2.2	175	0.0370	1.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	216	Total			

Summary for Subcatchment 3S: East

Runoff = 0.42 cfs @ 12.12 hrs, Volume= 0.019 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10 yr Rainfall=4.23"

Area (sf)	CN	Description
2,280	98	Unconnected pavement, HSG C
1,545	65	Brush, Good, HSG C
3,825	85	Weighted Average
1,545		40.39% Pervious Area
2,280		59.61% Impervious Area
2,280		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	34	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.84"
0.7	21	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	55	Total			

Summary for Pond 1P: North Basin

Inflow Area = 1.095 ac, 45.89% Impervious, Inflow Depth > 1.98" for 10 yr event
Inflow = 3.45 cfs @ 12.18 hrs, Volume= 0.180 af
Outflow = 0.12 cfs @ 14.90 hrs, Volume= 0.071 af, Atten= 96%, Lag= 163.2 min
Discarded = 0.07 cfs @ 14.90 hrs, Volume= 0.050 af
Primary = 0.06 cfs @ 14.90 hrs, Volume= 0.021 af

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 988.12' @ 14.90 hrs Surf.Area= 9,379 sf Storage= 5,480 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 136.8 min (925.7 - 788.9)

Volume	Invert	Avail.Storage	Storage Description
#1	987.50'	19,950 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.50	8,272	0	0
988.00	9,156	4,357	4,357
989.00	11,001	10,079	14,436
989.50	11,056	5,514	19,950

Device	Routing	Invert	Outlet Devices
#1	Discarded	987.50'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	988.00'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 988.00' / 987.00' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	988.65'	**4.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.07 cfs @ 14.90 hrs HW=988.12' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.06 cfs @ 14.90 hrs HW=988.12' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Inlet Controls 0.06 cfs @ 1.05 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: South Basin

Inflow Area = 1.253 ac, 34.65% Impervious, Inflow Depth > 1.68" for 10 yr event
Inflow = 3.48 cfs @ 12.17 hrs, Volume= 0.175 af
Outflow = 0.50 cfs @ 12.71 hrs, Volume= 0.104 af, Atten= 86%, Lag= 32.3 min
Discarded = 0.03 cfs @ 12.71 hrs, Volume= 0.020 af
Primary = 0.47 cfs @ 12.71 hrs, Volume= 0.084 af

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 982.19' @ 12.71 hrs Surf.Area= 4,011 sf Storage= 4,149 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 80.4 min (874.8 - 794.4)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	10,232 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	2,986	0	0
982.00	3,832	3,409	3,409
983.00	4,779	4,306	7,715
983.50	5,290	2,517	10,232

Device	Routing	Invert	Outlet Devices
#1	Discarded	981.00'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	981.85'	**15.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 981.85' / 981.00' S= 0.0425 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Primary	983.10'	**4.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.03 cfs @ 12.71 hrs HW=982.19' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.47 cfs @ 12.71 hrs HW=982.19' (Free Discharge)
├**2=Culvert** (Inlet Controls 0.47 cfs @ 1.75 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Total

Inflow Area = 1.183 ac, 46.91% Impervious, Inflow Depth > 0.40" for 10 yr event
Inflow = 0.42 cfs @ 12.12 hrs, Volume= 0.040 af
Primary = 0.42 cfs @ 12.17 hrs, Volume= 0.040 af, Atten= 0%, Lag= 3.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Subcatchment 1S: North

Runoff = 7.91 cfs @ 12.17 hrs, Volume= 0.423 af, Depth> 4.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=7.38"

Area (sf)	CN	Description
21,898	98	Unconnected pavement, HSG C
25,816	61	Pasture/grassland/range, Good, HSG B
47,714	78	Weighted Average
25,816		54.11% Pervious Area
21,898		45.89% Impervious Area
21,898		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry,**

Summary for Subcatchment 2S: South

Runoff = 8.61 cfs @ 12.16 hrs, Volume= 0.438 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=7.38"

Area (sf)	CN	Description
18,918	98	Unconnected roofs, HSG C
35,682	61	Pasture/grassland/range, Good, HSG B
54,600	74	Weighted Average
35,682		65.35% Pervious Area
18,918		34.65% Impervious Area
18,918		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	41	0.0240	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.84"
2.2	175	0.0370	1.35		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.1	216	Total			

Summary for Subcatchment 3S: East

Runoff = 0.85 cfs @ 12.11 hrs, Volume= 0.040 af, Depth> 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100 yr Rainfall=7.38"

Area (sf)	CN	Description
2,280	98	Unconnected pavement, HSG C
1,545	65	Brush, Good, HSG C
3,825	85	Weighted Average
1,545		40.39% Pervious Area
2,280		59.61% Impervious Area
2,280		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	34	0.0500	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.84"
0.7	21	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
5.1	55	Total			

Summary for Pond 1P: North Basin

Inflow Area = 1.095 ac, 45.89% Impervious, Inflow Depth > 4.63" for 100 yr event
Inflow = 7.91 cfs @ 12.17 hrs, Volume= 0.423 af
Outflow = 1.27 cfs @ 12.64 hrs, Volume= 0.299 af, Atten= 84%, Lag= 28.1 min
Discarded = 0.07 cfs @ 12.64 hrs, Volume= 0.061 af
Primary = 1.20 cfs @ 12.64 hrs, Volume= 0.238 af

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 988.62' @ 12.64 hrs Surf.Area= 10,293 sf Storage= 10,348 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 82.7 min (857.7 - 775.0)

Volume	Invert	Avail.Storage	Storage Description
#1	987.50'	19,950 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.50	8,272	0	0
988.00	9,156	4,357	4,357
989.00	11,001	10,079	14,436
989.50	11,056	5,514	19,950

Device	Routing	Invert	Outlet Devices
#1	Discarded	987.50'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	988.00'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 988.00' / 987.00' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Primary	988.65'	**4.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.07 cfs @ 12.64 hrs HW=988.62' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=1.20 cfs @ 12.64 hrs HW=988.62' TW=0.00' (Dynamic Tailwater)
├**2=Culvert** (Inlet Controls 1.20 cfs @ 2.36 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: South Basin

Inflow Area = 1.253 ac, 34.65% Impervious, Inflow Depth > 4.19" for 100 yr event
Inflow = 8.61 cfs @ 12.16 hrs, Volume= 0.438 af
Outflow = 3.99 cfs @ 12.34 hrs, Volume= 0.362 af, Atten= 54%, Lag= 10.8 min
Discarded = 0.03 cfs @ 12.34 hrs, Volume= 0.024 af
Primary = 3.96 cfs @ 12.34 hrs, Volume= 0.339 af

Routing by Sim-Route method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 983.04' @ 12.34 hrs Surf.Area= 4,821 sf Storage= 7,913 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 37.7 min (817.2 - 779.5)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	10,232 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	2,986	0	0
982.00	3,832	3,409	3,409
983.00	4,779	4,306	7,715
983.50	5,290	2,517	10,232

Device	Routing	Invert	Outlet Devices
#1	Discarded	981.00'	**0.300 in/hr Exfiltration over Surface area**
#2	Primary	981.85'	**15.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 981.85' / 981.00' S= 0.0425 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#3	Primary	983.10'	**4.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.03 cfs @ 12.34 hrs HW=983.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=3.95 cfs @ 12.34 hrs HW=983.04' (Free Discharge)
├**2=Culvert** (Inlet Controls 3.95 cfs @ 3.28 fps)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link 1L: Total

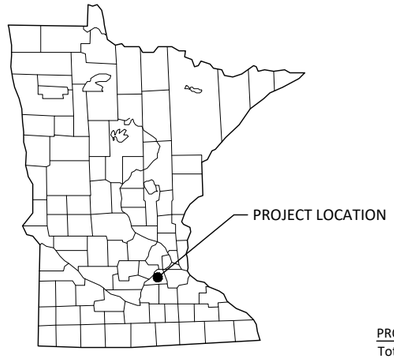
Inflow Area = 1.183 ac, 46.91% Impervious, Inflow Depth > 2.81" for 100 yr event
Inflow = 1.28 cfs @ 12.57 hrs, Volume= 0.277 af
Primary = 1.28 cfs @ 12.62 hrs, Volume= 0.277 af, Atten= 0%, Lag= 3.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

PRIOR LAKE PICKLEBALL FACILITY

CITY OF PRIOR LAKE
SCOTT COUNTY, MINNESOTA



LEGEND

- 1-MILE BOUNDARY
- PROJECT BOUNDARY
- OR — IMPAIRED, SPECIAL OR PROTECTED WATERS
- NATIONAL WETLANDS INVENTORY
- CALCAREOUS FEN
- RECEIVING WATERS

RESPONSIBLE PARTIES:
The Contractor and Owner will be joint applicants under the MPCA's General Stormwater Permit for Construction Activity as required by the National Pollutant Discharge Elimination System (NPDES) Phase II program.

The Contractor shall provide one or more trained Construction SWPPP Manager(s) knowledgeable and experienced in the application of erosion prevention and sediment control BMPs that will oversee the implementation of the SWPPP, and the installation, inspection and maintenance of the erosion prevention and sediment control BMPs.

A Construction SWPPP Manager must be available for an on-site inspection within 72 hours upon request by the MPCA.

	COMPANY	CONTACT PERSON	PHONE
OWNER:	City of Prior Lake	Pete Young	952-447-9831
SWPPP DESIGNER:	Bolton & Menk, Inc.	Lanol Leichty	952-890-0509
CONTRACTOR:	TBD	TBD	TBD
CONSTRUCTION SWPPP MANAGER:	TBD	TBD	TBD
PARTY RESPONSIBLE FOR LONG TERM O&M:	City of Prior Lake	Pete Young	952-447-9831

The SWPPP Designer, Construction SWPPP Manager, and BMP Installer must have appropriate training. Documentation showing training commensurate with the job duties and responsibilities is required to be included in the SWPPP prior to any work beginning on the site. Training documentation for the SWPPP Designer is included on the Narrative sheet. The Contractor shall attach training documentation to this SWPPP for the Construction SWPPP Manager and BMP Installer prior to the start of construction. This information shall be kept up to date until the project NOT is filed.

ADDITIONAL COMPENSATION
Payment for all work associated with Erosion and Sediment Control shall be as described in the Project Manual. Unless otherwise authorized by the Owner no additional payment shall be made for any work required to administer and maintain the site erosion and sediment control in compliance with the Minnesota Pollution Control Agency (MPCA) - General Stormwater Permit for Construction Activity (MN R100001) including but not limited to inspection, maintenance, and removal of BMPs or addition of BMPs to accommodate Contractor phasing.

DOCUMENT RETENTION
Permittees must make the SWPPP, including all inspection reports, maintenance records, training records and other information required by this permit, available to federal, state, and local officials within three (3) days upon request for the duration of the permit and for three (3) years following the NOT.

GENERAL STORMWATER DISCHARGE REQUIREMENTS
All requirements listed in Section 5.1 of the Permit for the design of the permanent stormwater management system and discharge have been included in the preparation of this SWPPP. These include but are not limited to:

1. The expected amount, frequency, intensity, and duration of precipitation.
2. The nature of stormwater runoff and run-on at the site
3. Peak flow rates and stormwater volumes to minimize erosion at outlets and downstream channel and stream bank erosion.
4. The range of soil particle sizes expected to be present on the site.

Permanent stormwater treatment systems for this project have been designed in accordance with the guidance in the MN Stormwater Manual in place at the time of bidding. Copies of the design information and calculations are part of this SWPPP and will be provided in digital format upon written request to the Engineer.

PROJECT AREAS:

Total Project Size (disturbed area) =	2.6	ACRES
Existing area of impervious surface =	0.04	ACRES
Post construction area of impervious surface =	1.0	ACRES
Total new impervious surface area created =	1.0	ACRES

Planned Construction Start Date:	10/01/2020
Estimated Construction Completion Date:	06/01/2021

PERMANENT STORMWATER MANAGEMENT SYSTEM:
Type of storm water management used if more than 1 acre of new impervious surface is created:

	Wet Sedimentation Basin
X	Infiltration/Filtration
	Regional Pond
	Permanent Stormwater Management Not Required

PROJECT LOCATION:

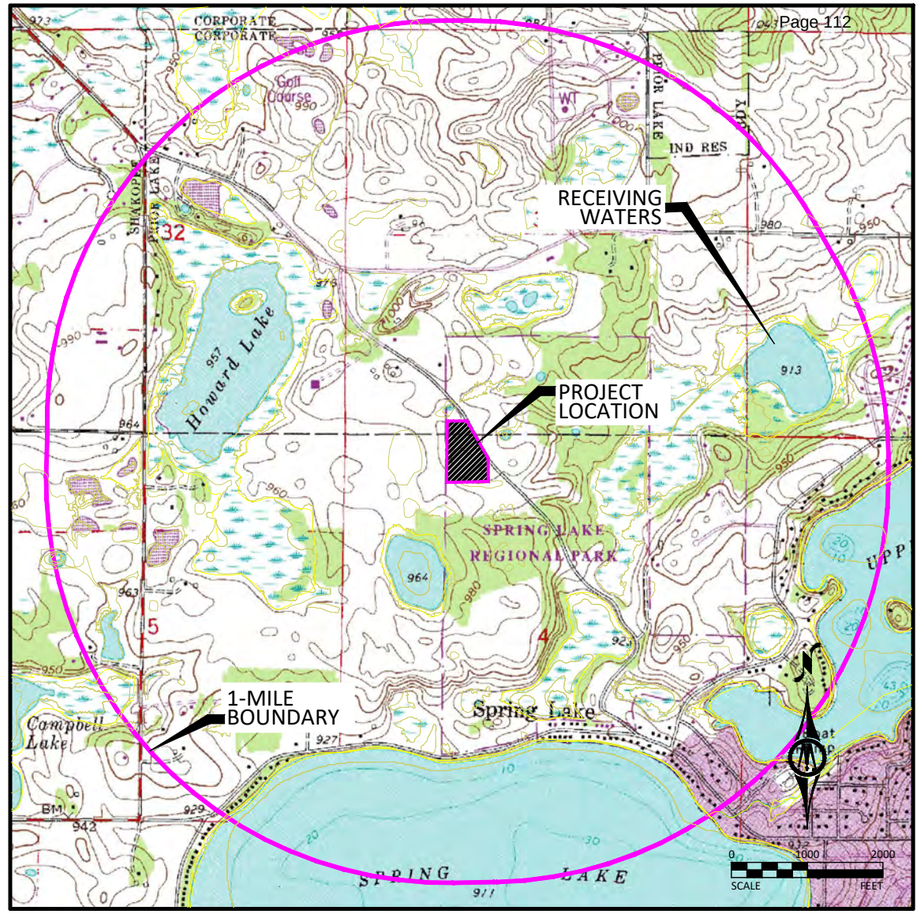
COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
Scott	T114N	R22W	4	44.716359°	-93.473578°

BMP SUMMARY	QUANTITY	UNIT
STABILIZED CONSTRUCTION EXIT	1	EACH
SILT FENCE, TYPE MACHINE SLICED	2,500	LF
SEDIMENT CONTROL LOG, TYPE COMPOST	350	LF
EROSION CONTROL BLANKET, CATEGORY 3N	2,092	SY
SEED & HYDROMULCH	1.6	AC

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Site grading, stormwater basins, pickleball court, gravel parking lot, temporary erosion and sediment control, and permanent stabilization.

The site currently drains in two directions, to the south and to the north. The south catchment ultimately reaches Artic Lake and the north catchment drains to an isolated wetland. After construction is complete stormwater will continue to runoff with similar drainage patterns.

This project includes the following stormwater management BMPs: Infiltration/filtration basins for rate and volume control of stormwater runoff.



RECEIVING WATERS:
Receiving waters, including surface water, wetlands, Public Waters, and stormwater ponds, within 1-mile of the project boundary are identified on the USGS 7.5 min quad map above. Receiving waters that are impaired, the impairment, and WLA are listed as follows. All specific BMPs relative to construction activities listed in the permit for special, prohibited, restricted, or impaired have been incorporated into this plan. All specific BMPs listed in approved TMDLs and those BMPs listed for construction related waste load allocations have also been incorporated.

NAME OF WATER BODY	TYPE (ditch, pond, wetland, lake, etc.)	Special, Prohibited, Restricted Water [1]	Flows to Impaired Water Within 1-Mile [2]	USEPA Approved Construction Related TMDL [3]
Artic Lake	Lake	No	No	No

[1] Special, prohibited, and restricted waters are listed in Section 23 of the MN Construction Stormwater General Permit (MNR100001).
[2] Identified as impaired under section 303 (d) of the federal Clean Water Act for phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.
[3] Construction Related TMDLs include those related to: phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.

IMPLEMENTATION SCHEDULE AND PHASING: The Contractor is required to provide an updated schedule and site management plan meeting the minimum requirements of Section 1717 of the Minnesota Standard Specifications for Construction.

1) Submit SWPPP Updates to Engineer. Submittal shall include any requested changes to the SWPPP, including but not limited to: Trained Personnel, Locations for Stockpiles, Concrete Washout, Sanitation Facilities, Types and Locations of Erosion & Sediment Control. Failure to submit updates shall be considered acceptance of the SWPPP as designed with no changes.
2) Install perimeter sediment control, inlet protection, and construction exit.
3) Perform removals and clearing and grubbing operations.
4) Grade the site to subgrade elevations.
5) Construct stormwater basins and install storm sewer.
6) Complete rapid stabilization.
7) Complete roadway and parking lot construction.
8) Complete turf restoration.
9) Add additional temporary BMPs as necessary during construction based on inspection reports.
10) Ensure final stabilization measures are complete.
11) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
12) Submit Notice of Termination (NOT) to MPCA. NOTE: The NOT must be submitted to MPCA before Final Stabilization is considered complete.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

ENGINEER'S NAME
LIC. NO. XXXXX DATE MM/DD/YYYY

BOLTON & MENK
12224 NICOLLET AVENUE
BURNSVILLE, MINNESOTA 55337
Phone: (952) 890-0509
Email: Burnsville@bolton-menk.com
www.bolton-menk.com

DESIGNED	NO.	ISSUED FOR	DATE
LLL			
DRAWN			
LLL			
CHECKED			
XXX			
CLIENT PROJ. NO.			
T18.122360			

PRIOR LAKE, MINNESOTA
PRIOR LAKE PICKLEBALL FACILITY
SWPPP PROJECT INFO MAP

SHEET C2.01

.\Project Border.dwg

Information contained in this SWPPP narrative sheet summarizes requirements of the GENERAL PERMIT AUTHORIZATION TO DISCHARGE STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM PROGRAM - Permit No: MN RI0000l (Permit) as they apply to this project. All provisions of the Permit including those not specifically cited herein shall apply to this project. The Contractor is responsible to be familiar with and comply with all conditions of the permit. The full text of the Permit is available at: https://www.pca.state.mn.us/sites/default/files/wq-strm2-80a.pdf

SWPPP AMENDMENTS AND SUBMITTALS

Contractor must prepare and submit to the Engineer a SWPPP amendment as necessary to include additional Best Management Practices (BMPs) to correct problems identified or address the following situations.

1. Contact information and training documentation for Construction SWPPP Manager and BMP Installer,
2. There is a change in construction method of phasing, operation, maintenance, weather or seasonal conditions not anticipated during the design of the SWPPP including but not limited to:
   a. Types and/or Locations of BMPs
   b. Material Storage and Spill Response
   c. Fueling Plans
   d. Locations for Stockpiles, Concrete Washout, and Sanitation Facilities and
   e. Project Phasing
3. It is determined that the SWPPP is not achieving objectives of minimizing pollutants in stormwater discharges associated with construction activity, or
4. The SWPPP is not consistent with the terms and conditions of the permit.

The Contractor may implement SWPPP amendments immediately and is not required to wait for Engineer review of the submittal. The responsibility for completeness of SWPPP amendments and compliance with the Permit lies with the Contractor. Review, comment, or lack of comment by the Engineer on a SWPPP amendment shall not absolve the responsibilities of the Contractor in any way.

If a change order is issued for a design change the SWPPP amendment will be prepared by the Engineer and included in the change order.

In addition to SWPPP amendments, the Contractor shall submit to the Engineer Weekly Erosion and Sediment Control Schedule meeting the requirements of MnDOT 1717.

The Contractor shall keep copies of all SWPPP amendments, Weekly Erosion and Sediment Control Schedules, inspection logs, and maintenance logs with the field copy of the SWPPP. A PDF copy of these documents will be provided along with a copy of the final Field Copy of the SWPPP to the Engineer along with the signed Notice of Termination when final stabilization is complete.

EROSION PREVENTION PRACTICES

Stormwater conveyance channels shall be routed around unstabilized areas. Erosion controls and velocity dissipation devices shall be used at outlets within and along the length of any constructed conveyance channel.

The normal wetted perimeter of all ditches or swales, including storm water management pond slopes, that drain waters from the site must be stabilized within 200' of any property edge or discharge point, including storm sewer inlets, within 24 hours of connection.

Temporary or permanent ditches or swales used as sediment containment during construction do not need to be stabilized during temporary period of use and shall be stabilized within 24 hours after no longer used as sediment containment.

Mulch, hydromulch, tackifier, or similar practice shall not be used in any portion of the wetted perimeter of a temporary or permanent drainage ditch or swale section with a continuous slope of greater than 2 percent.

Energy dissipation shall be installed at all temporary or permanent pipe outlets within 24 hours of connection to a surface water or permanent stormwater treatment system.

The Contractor shall phase construction and use construction methods to the extent practical to minimize exposed soils. The project phasing shall be documented in the Weekly Erosion and Sediment Control Schedule.

SEDIMENT CONTROL PRACTICES

Down gradient BMPs including perimeter BMPs must be in place before up gradient land- disturbing activities begin and shall remain in place until final stabilization.

All BMPs that have been adjusted or removed to accommodate short-term activities shall be re-installed or replaced the earlier of the end of the work day or before the next precipitation event even if the activity is not complete.

Inlet BMPs may be removed for specific safety concerns. The BMPs shall be replaced as soon as the safety concern is resolved. The removal shall be documented in the SWPPP as a SWPPP amendment.

Temporary stockpiles must have sediment control BMPs. The Contractor shall prepare and submit to the Engineer a SWPPP amendment showing the location of temporary stockpiles and the BMPs for each stockpile. The SWPPP amendment must meet the minimum requirements of Section 9 of the Permit.

Soil compaction shall be minimized and topsoil shall be preserved, unless infeasible or if construction activities dictate soil compaction or topsoil stripping.

The use of polymers, flocculants, or other sedimentation treatment chemicals are not proposed as part of this SWPPP as designed by the Engineer. If methods or phasing of construction require the use of any of these chemicals, the Contractor shall prepare and submit to the Engineer a SWPPP amendment that meets the minimum requirements of Section 9 of the Permit.

TEMPORARY SEDIMENTATION BASINS

A temporary sedimentation basin has not been included in this SWPPP as designed by the Engineer. If a basin is later determined to be desirable or necessary the Contractor shall prepare and submit to the Engineer a SWPPP amendment. Temporary sedimentation basins shall meet or exceed the minimum requirements of Section 14 of the Permit and shall include a basin draining plan meeting or exceeding the minimum requirements of Section 10 of the Permit. Where the site discharges to Special and/or Impaired Waters the SWPPP amendment shall also meet or exceed the minimum requirements of Section 23 of the permit.

DEWATERING

A dewatering plan has not been included in this SWPPP as designed by the Engineer. If dewatering is required for this project, the Contractor shall prepare and submit to the Engineer a SWPPP amendment. All dewatering shall meet or exceed the minimum requirements of Section 10 of the Permit.

POLLUTION PREVENTION

Products and materials that have the potential to leach pollutants that are stored on the site must be stored in a manner designed to minimize contact with stormwater. Materials that are not a source of potential contamination to stormwater or that are designed for exposure to stormwater are not required to be covered.

Hazardous materials including but not limited to pesticides, fertilizer, petroleum products, curing compounds and toxic waste must be properly stored and protected from stormwater exposure as recommended by the manufacturer in an access restricted area.

Solid waste must be stored, collected and disposed of in compliance with Minnesota Administrative Rules Chapter 7035.

Portable toilets must be positioned so that they are secure and will not be tipped or knocked over. Sanitary waste must be disposed of properly in accordance with Minn. R. CH 7041.

Exterior vehicle or equipment washing on the project site shall be limited to a defined area of the site. No engine degreasing is allowed on site. A sign must be installed adjacent to each washout facility that requires site personnel to utilize the proper facilities for disposal of concrete and other washout wastes.

The Contractor shall prepare and submit a SWPPP amendment detailing the location and BMPs proposed for storage of materials, solid waste, portable toilets, and exterior vehicle or equipment washing on the site. The SWPPP amendment shall include a spill prevention and response plan that is appropriate for the materials proposed to be on the site. The SWPPP amendment shall meet or exceed the minimum requirements of Section 12 of the Permit.

INSPECTION & MAINTENANCE

A trained person shall routinely inspect the entire construction site at the time interval indicated on this sheet of the SWPPP during active construction and within 24-hours after a rainfall event greater than 0.5 inches in 24 hours. Following an inspection that occurs within 24-hours after a rainfall event, the next inspection must be conducted at the time interval indicated in the Receiving Waters Table found on the SITE PLAN AND INFORMATION SHEET of the SWPPP.

All inspections and maintenance conducted during construction must be recorded on the day it is completed and must be retained with the SWPPP. Inspection report forms are available in the Project Specifications. Inspection report forms other than those provided shall be approved by the engineer.

The Contractor may request a change in inspection schedule for the following conditions:

a. Inspections of areas with permanent cover to be reduced to once per month,
b. Inspections of areas that have permanent cover and have had no construction activity for 12 months to be suspended until construction resumes,
c. Inspections of areas where construction is suspended due to frozen ground conditions, inspections to be suspended until the earlier of within 24 hours of runoff occurring, or upon resuming construction.

No change in inspection schedule shall occur until authorized by the Engineer.

Inspections must include:

1. All erosion prevention and sediment control BMPs and Pollution Prevention Management Measures to ensure integrity and effectiveness.
2. Surface waters, including drainage ditches and conveyance systems for evidence of erosion and sediment deposition.
3. Construction site vehicle exit locations, streets and curb and gutter systems within and adjacent to the project for sedimentation from erosion or tracked sediment from vehicles.
4. Infiltration areas to ensure that no sediment from ongoing construction activity is reaching the infiltration area and that equipment is not being driven across the infiltration area.

All non-functioning BMPs and those BMPs where sediment reaches one-half (1/2) of the depth of the BMP, or in the case of sediment basins one-half (1/2) of the storage volume, must be repaired, replaced, or supplemented by the end of the next business day after discovery, or as soon as field conditions allow.

Permittees must repair, replace or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery, or as soon as field conditions allow.

Any sediment that escapes the site must be removed and the area stabilized within 7 calendar days of discovery unless precluded by legal, regulatory, or physical access in which case the work shall be completed within 7 calendar days of authorization. Paved surfaces such as streets shall have any escaped or tracked sediment removed by the end of the day that it is discovered. Sediment release, other than paved surfaces that can be cleaned up with street sweeping shall be reported immediately upon discovery to the Engineer.

PUBLIC WATER RESTRICTIONS:

For public waters that have been promulgated "work in water restrictions" during fish spawning time frames, all exposed soil areas that are within 200 feet of the water's edge, and drain to these waters must complete stabilization within 24-hours during the time period. MN DNR permits are not valid for work in waters that are designated as infested waters unless accompanied by an Infested Waters Permit or written notification has been obtained from MN DNR stating that such permit is not required. There is no exception for pre-existing permits. If a MN DNR Permit has been issued for the project and the water is later designated as infested, the Contractor shall halt all work covered by the MN DNR Permit until an Infested Waters Permit is obtained or that written notification is obtained stating that such permit is not required.

FINAL STABILIZATION

Final Stabilization is not complete until all the following requirements have been met:

1. Substantial Completion has been reached and no ground disturbing activities are anticipated.
2. Permanent cover has been installed with an established minimum uniform perennial vegetation density of 70 percent of its expected final growth. Vegetation is not required in areas where no vegetation is proposed by this project such as impervious surfaces or the base of a sand filter.
3. Accumulated sediment has been removed from all permanent stormwater treatment systems as necessary to ensure the system is operating as designed.
4. All sediment has been removed from conveyance systems
5. All temporary synthetic erosion prevention and sediment control BMPs have been removed. BMPs designated on the SWPPP to remain to decompose on-site may remain.
6. For residential construction only, permit coverage terminates on individual lots if the structures are finished and temporary erosion prevention and downgradient perimeter control is complete, the residence sells to the homeowner, and the permittee distributes the MPCA's "Homeowner Fact Sheet" to the homeowner.
7. For agricultural land only (e.g., pipelines across cropland), the disturbed land must be returned to its preconstruction agricultural use prior to submitting the NOT.

SITE STABILIZATION COMPLETION:

Stabilization of exposed soils shall begin immediately and shall be completed after the construction activity has temporarily or permanently ceased no later than:	14 calendar days

SITE INSPECTION INTERVAL:

A trained person shall routinely inspect the entire construction site during active construction at an interval of no less than:	7 calendar days

SPECIAL ENVIRONMENTAL CONSIDERATIONS AND PERMITS:

1)	Was an environmental review required for this project or any part of a common plan of development or sale that includes all or any portion of this project?	NO
2)	Does any portion of the site have the potential to affect threatened or endangered species or their critical habitat?	NO
3)	Does any portion of this site discharge to a Calcareous fen.	NO
4)	Will any portion of the site potentially affect properties listed on the National Register of Historic Places or a known or discovered archeological site?	NO
5)	Have any Karst features have been identified in the project vicinity?	NO
6)	Is compliance with temporary or permanent stormwater management design requirements infeasible for this project?	NO
7)	Has the MN DNR promulgated "work in water restrictions" for any Public Water this site disharges to during fish spawning?	NO

TYPE OF PERMIT	PERMITTING AGENCY	PERMIT STATUS AND CONDITIONS
Construction Stormwater NPDES	MPCA	To Be Applied For

SWPPP DESIGNER TRAINING DOCUMENTATION:

HORZ. 0 25 50 SCALE FEET
VERT. 0 5 10 SCALE FEET

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ENGINEER'S NAME
LIC. NO. XXXXX DATE MM/DD/YYYY

BOLTON & MENK

DESIGNED LLL
DRAWN LLL
CHECKED XXX
CLIENT PROJ. NO. T18.122360

NO.	ISSUED FOR	DATE

PRIOR LAKE, MINNESOTA
PRIOR LAKE PICKLEBALL FACILITY
SWPPP NARRATIVE

SHEET C2.02

ef .\Project Border.dwg

LEGEND

- PROJECT BOUNDARY
- SOIL TYPE
- IMPAIRED, SPECIAL OR PROTECTED WATERS
- NATIONAL WETLANDS INVENTORY
- DWSMA, LOW VULNERABILITY
- STEEP SLOPES (>33.3%)
- RECEIVING WATERS

N

0 50 100
SCALE FEET

SOIL TYPE SUMMARY

Map Unit Symbol	Soil Name	Hyd. Soil Group	Erodibility
MUSYM	MUNAME	HYDGRP	MUHELCL
Df	Dundas silt loam, 0-2 % slopes	C/D	NHEL
Ga	Glencoe silty clay loam	B/DB	NHEL
HaB2	Hayden loam, 2-6% slopes, moderately eroded	B	NHEL

NHEL - Not Highly Erodible Land
PHEL - Potentially Highly Erodible Land
HEL - Highly Erodible Land

LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN

DESCRIPTION	SHEET NO.
SITE MAP	C2.01
DIRECTION OF FLOW	C2.XX
FINAL STABILIZATION	C2.XX
SOILS	C2.03
DRAINAGE STRUCTURES	C1.XX
DRAINAGE TABULATION	C1.XX
STORM SEWER PLAN & PROFILE SHEETS	C5.XX - C5.XX
EROSION & SEDIMENT CONTROL DETAILS	C2.04
EROSION CONTROL TABULATION	C2.XX
TURF ESTABLISHMENT TABULATION	C2.XX
NARRATIVE & NOTES	C2.01 - C2.02

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ENGINEER'S NAME
LIC. NO. XXXXX DATE MM/DD/YYYY

BOLTON & MENK

DESIGNED	NO.	ISSUED FOR	DATE
LLL			
DRAWN			
LLL			
CHECKED			
XXX			
CLIENT PROJ. NO.			
T18.122360			

PRIOR LAKE, MINNESOTA
PROJECT NAME
SWPPP SOILS INFORMATION

SHEET
C2.03

Xref .\Project Border.dwg

INFILTRATION BASIN TOP CONTOUR = 989.5
INFILTRATION BASIN BOTTOM = 987.5
BOTTOM OF BLENDED SOIL = 985.5
RIP SUBGRADE PRIOR TO PLACEMENT OF BLENDED SOILS

INFILTRATION BASIN TOP CONTOUR = 983.5
INFILTRATION BASIN BOTTOM = 981.0
BOTTOM OF BLENDED SOIL = 979.0
RIP SUBGRADE PRIOR TO PLACEMENT OF BLENDED SOILS

EXISTING 8" CMP CULVERT INVERT 977.12

4" PERFORATED UNDER DRAIN WITH KNIFE VALVE NOTCHED INTO BOTTOM PER DETAIL

GRADING LIMITS

4" PERFORATED UNDERDRAIN WITH KNIFE VALVE NOTCHED INTO BOTTOM PER DETAIL

106.5'

APPROXIMATE WETLAND BOUNDARY

DAYLIGHT DRAINTILE AT 985.0

DAYLIGHT DRAINTILE AT 978.0

EXISTING 12" RCP CULVERT INVERT 981.03

EROSION CONTROL LEGEND

- MS — MACHINE SLICED SILT FENCE
- INLET PROTECTION
- HYDRAULIC MATRIX TYPE MULCH, SEED MIX 25-141, FERTILIZER
- HYDRAULIC MATRIX TYPE MULCH, SEED MIX 35-241, FERTILIZER
- STRAW BLANKET, SEED MIX 33-261, FERTILIZER
- STABILIZED CONSTRUCTION EXIT
- BIOLOGS

HORZ. 0 30 60 SCALE FEET

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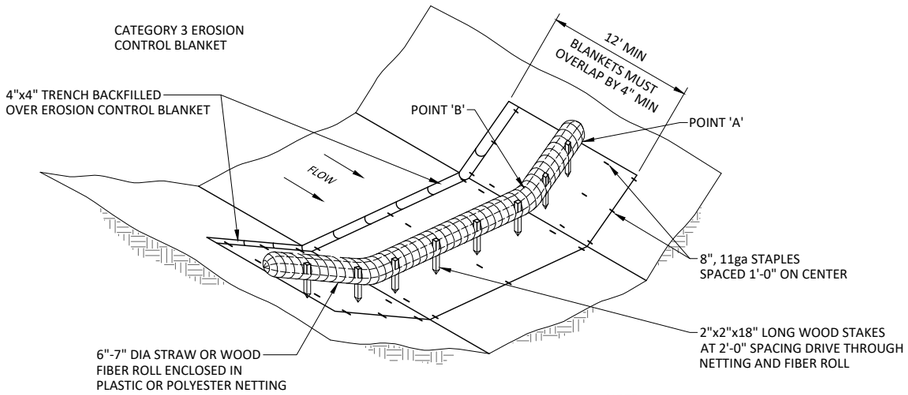
ERIC J. SEABURG
LIC. NO. 53712 DATE MM/DD/YYYY

BOLTON & MENK

DESIGNED	NO.	ISSUED FOR	DATE
EJS			
DRAWN			
EJS			
CHECKED			
BJH			
CLIENT PROJ. NO.			
XXXXXXXXXX			

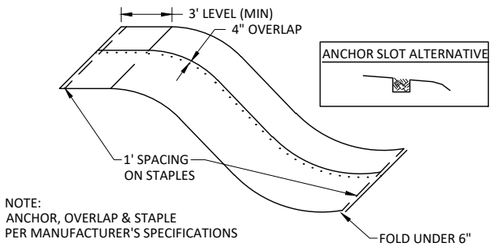
PRIOR LAKE, MN
PRIOR LAKE PICKLEBALL FACILITY
EROSION CONTROL PLAN

SHEET C2.04



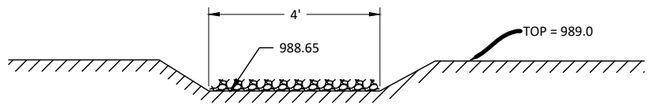
DITCH CHECK - BIOROLL
NOT TO SCALE

NOTE:
POINT 'A' MUST BE 1'-0" MIN HIGHER THAN POINT 'B' TO ENSURE THAT WATER FLOWS OVER THE DITCH CHECK AND NOT AROUND THE ENDS

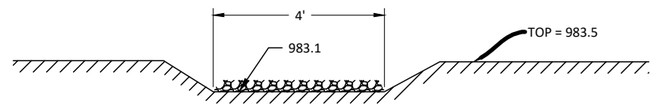


NOTE:
ANCHOR, OVERLAP & STAPLE PER MANUFACTURER'S SPECIFICATIONS

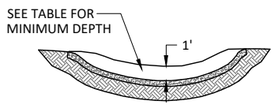
EROSION CONTROL BLANKET INSTALLATION
NOT TO SCALE



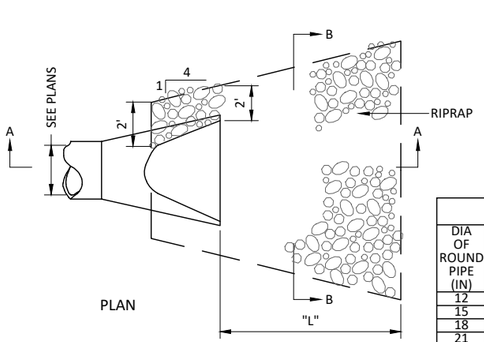
NORTH BASIN EOF DETAIL
NOT TO SCALE



SOUTH BASIN EOF DETAIL
NOT TO SCALE

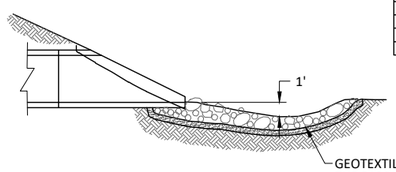


SECTION B-B



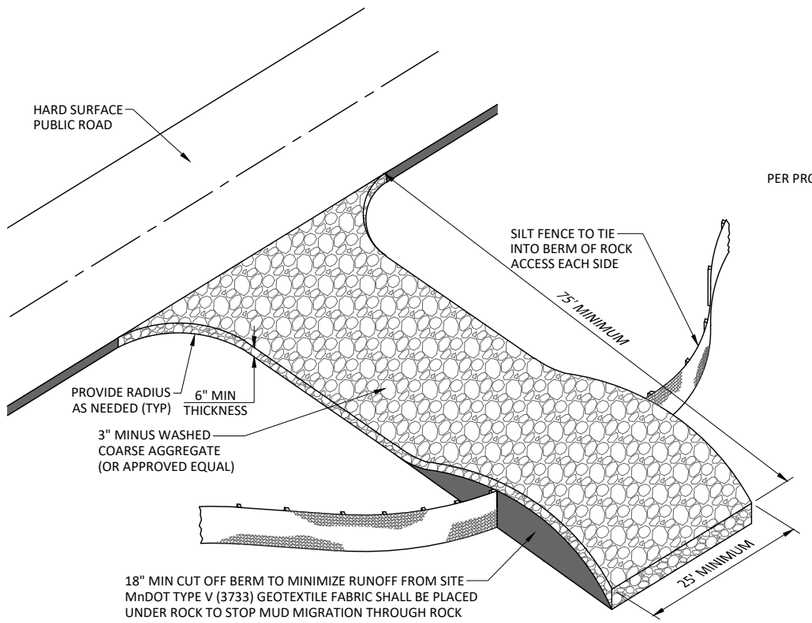
PLAN

DIA OF ROUND PIPE (IN)	L (FT)	CLASS II d50=6" 12" DEPTH RIPRAP (CU YD)	CLASS III d50=9" 18" DEPTH RIPRAP (CU YD)	CLASS IV d50=12" 24" DEPTH RIPRAP (CU YD)
12	8	5	8	10
15	8	5	8	10
18	10	6	10	15
21	10	8	15	15
24	12	10	15	20
27	12	10	15	20
30	14	15	20	25
36	16	18	25	30
42	18	20	30	40
48	20	20	40	50

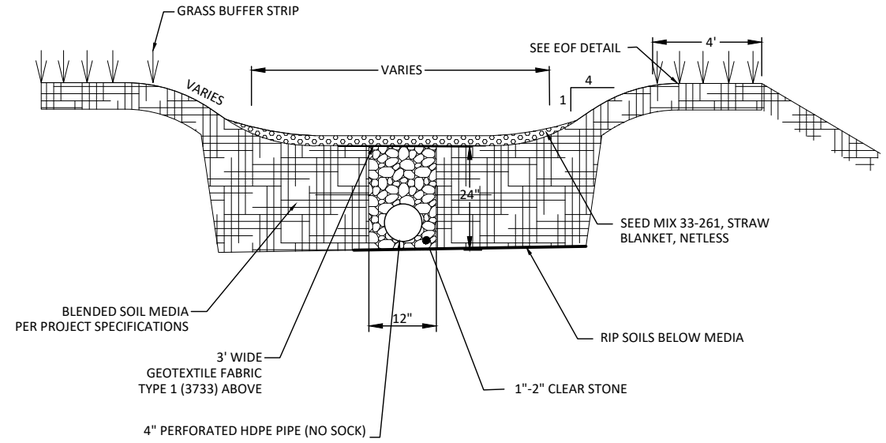


SECTION A-A

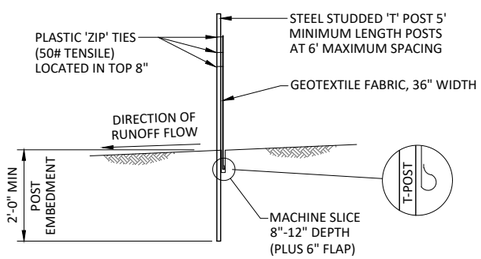
RIPRAP AT RCP CULVERT END
NOT TO SCALE



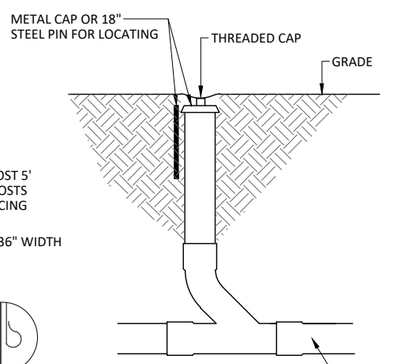
ROCK CONSTRUCTION ENTRANCE
NOT TO SCALE



TYPICAL BASIN CROSS-SECTION
NOT TO SCALE



SILT FENCE - MACHINE SLICED
NOT TO SCALE



SUBSURFACE DRAIN CLEANOUT
NOT TO SCALE

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ERIC J. SEABURG
LIC. NO. 53712 DATE MM/DD/YYYY

BOLTON & MENK

DESIGNED	EJS
DRAWN	EJS
CHECKED	BJH
CLIENT PROJ. NO.	XXXXXXXXX

NO.	ISSUED FOR	DATE

PRIOR LAKE, MN
PRIOR LAKE PICKLEBALL FACILITY
EROSION CONTROL DETAILS

SHEET C2.05

INFILTRATION BASIN TOP CONTOUR = 989.5
INFILTRATION BASIN BOTTOM = 987.5
BOTTOM OF BLENDED SOIL = 985.5
RIP SUBGRADE PRIOR TO PLACEMENT OF BLENDED SOILS

INFILTRATION BASIN TOP CONTOUR = 983.5
INFILTRATION BASIN BOTTOM = 981.0
BOTTOM OF BLENDED SOIL = 979.0
RIP SUBGRADE PRIOR TO PLACEMENT OF BLENDED SOILS

4" PERFORATED UNDER-DRAIN WITH KNIFE VALVE NOTCHED INTO BOTTOM PER DETAIL

FUTURE PICNIC SHELTER / AMENITY LOCATION

GRADING LIMITS

DAYLIGHT DRAINTILE AT 978.0

INVERT = 981.85
20 LF 15" CMP
INVERT = 981.00
15 CY CL. 3 RIP RAP

EXISTING 8" CMP CULVERT INVERT 977.12

992.00
990.50
992.00
990.50

1.0%
1.0%
2.6%
2.6%
9.4%
3.5%
4.0%
4.0%

115.8'

APPROXIMATE WETLAND BOUNDARY

4" PERFORATED UNDER-DRAIN WITH KNIFE VALVE NOTCHED INTO BOTTOM PER DETAIL

DAYLIGHT DRAINTILE AT 985.0

EOF = 988.6

33.5' NWL TO PARKING LOT

INVERT = 987.00
15 CY CL. 3 RIP RAP

20 LF 12" CMP

INVERT = 988.00

EXISTING 12" RCP CULVERT INVERT 981.03

GRADING NOTES

1. PARKING LOT PERIMETER INCLUDES 4' TURF MAINTENANCE BUFFER AT 2%
2. PICKLEBALL COURT PERIMETER INCLUDES 6' TURF MAINTENANCE MUFFER AT 4% AWAY FROM COURTS
3. SALVAGE EXISTING TOPSOIL FOR USE IN FINAL TURF AREAS
4. PROTECT INFILTRATION BASINS IN ACCORDANCE WITH EROSION CONTROL PLAN

HORZ. SCALE 0 30 60 FEET

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ERIC J. SEABURG
LIC. NO. 53712 DATE MM/DD/YYYY

BOLTON & MENK

DESIGNED	EJS		
DRAWN	EJS		
CHECKED	BJH		
CLIENT PROJ. NO.	XXXXXXXXX		

NO.	ISSUED FOR	DATE

PRIOR LAKE, MN
PRIOR LAKE PICKLEBALL FACILITY
GRADING PLAN

SHEET C3.01

PLSLWD Board Staff Report
Thursday, September 10

Subject	PERMIT #2020.02: Pike Lake Outlet Culvert Replacement Project		
Board Meeting Date	September 10, 2020	**Item No**	4.4
Prepared By	Maggie Karschnia, Water Resources Project Manager		
Attachments	Project plans can be downloaded at https://www.plslwd.org/wp-content/uploads/2020/09/1376-0002_PkLkOutletReplacement.pdf.		
Proposed Motion	A motion authorizing PLSLWD staff to issue Permit #2020.02 to the City of Prior Lake, subject to the conditions listed below.		

BACKGROUND

The City of Prior Lake proposes to replace a severely degraded corrugated metal pipe culvert at the outlet of Pike Lake. The proposed project will replace the failing culvert with an equivalent culvert. EOR was the engineer for the City on the project and they ensured that the replaced culvert will approximate existing flow conditions.

Notice to Adjacent Landowners

As the only landowners within 500 feet of the planned improvements are the City of Prior Lake and SMSC, no notification to nearby residents was required. A written notice was sent to SMSC.

Note to Permit Applicant:

This report is not a permit. If the District Board approves the project, the applicant must then obtain a permit through the District staff.

Proposed Plan and Analysis

The project was reviewed for compliance with the following PLSLWD Rules:

Erosion and Sediment Control (Rule E)

While the size of the project would not normally trigger Rule E as it will disturb an area less than one acre, it is required to accompany Rule H. The City has net-less erosion control blanket and seeding listed in the plans for erosion control, but no biologs or other sediment control are specifically identified. It is recommended that sediment control measures be incorporated.

Bridge and Culvert Crossings (Rule H)

Any activity that constructs, improves, repairs or alters a driveway, road or utility across the Prior Lake outlet channel or a watercourse with a tributary area in excess of 100 acres triggers this Rule. The District requires that culvert crossings retain adequate hydraulic capacity, have no adverse effects on water quality, represent the lowest impact solution, and allow for future erosion, scour, and sedimentation considerations. The culvert repair activity under this permit conforms with the activities that were previously approved with the original permit.

DISCUSSION

Watershed District Board Decision:

The application was initially received on August 27, 2020 and determined to be complete. To meet the procedural requirements of Rule B and Minnesota Statutes Section 15.99 regarding time deadlines for Board action, the Board must make a decision to either:

1) approve or deny the permit application by October 26, 2020

-or-

2) provide written notice to the applicant of an extension of the 60-day period and state the reasons for the extension and its anticipated length, which may not exceed 60 days unless approved by the applicant.

Options for Action:

1. Approve the application subject to the conditions noted herein.
2. Table the item until a future date specified and provide the applicant with direction on the issues that have been discussed.
3. Deny the application, stating the reasons for the denial.
4. Other specific actions as directed by the Board of Managers.

RECOMMENDATION

Staff Recommendation:

District staff recommends Option 1, that the project be approved subject to the application submitted, the supplemental information submitted by the applicant's engineer, and with the conditions noted below.

Action Required:

A motion authorizing PLSLWD staff to issue a permit, subject to the following conditions:

1. The permittee shall obtain all other required permits and approvals.
2. The permittee shall supply the District an as-built survey within 35 days of project completion. The District shall review this survey as a part of the certificate of completion for the project.
3. The District will waive the requirement for a permit fee deposit.
4. The permittee is responsible for the stabilization and maintenance of the adjacent areas disturbed by the construction.
5. The permittee will incorporate sediment control measures and provide contact information for the responsible erosion control contractor prior to initiating work.


COUNTY ROAD 21
Culvert Replacement
21
Pike Lake
EAGLE CREEK AVE NE
42
140TH ST NE


ALL DISTURBED VEGETATED AREAS TO BE STABILIZED W/ MNDOT 35-241 MIX AND MNDOT CAT. 0 (NET-LESS) EROSION CONTROL BLANKET
02 03
820
0+50
17 CY CL. III RIPRAP
04 03
822
01 03
REPLACE CSAP (APPROX. 48" X 35") W/ 12 LF 51" X 31" RCAP
51" X 31" RCAP FES W/ FOOTING (TYP.)
03 03
822
EXISTING 24" RCP (TO REMAIN)
0+25
GRAVEL DRIVEWAY
824
SALVAGE GRAVEL AND RESTORE DRIVEWAY (SUPPLEMENT W/ CL. 5 AS NECESSARY)
0+00
17 CY CL. III RIPRAP
04 03
820
826

PRIOR LAKE - SPRING LAKE
WATERSHED DISTRICT

Prior Lake - Spring Lake Watershed District (PLSLWD)

4646 Dakota Street SE, Prior Lake, MN 55372, 952-447-4166

PERMIT APPLICATION, PAGE 1 OF 2

Note to Applicant: use this as the cover sheet for your application materials.

PROJECT NAME Pike Lake Outlet Culvert Replacement	**APPLICATION #: (to be assigned)**
Name of Owner - Applicant Phone #: 952-447-9831 City of Prior Lake Fax #: 952-447-4245	**Owner's Agent/Engineer:** Name Emmons & Olivier Resources, Inc.
Address of Owner - Applicant (Street, City, State, Zip Code) 4646 Dakota Street SE, Prior Lake, MN 55372	Phone 651-203-6024 E-mail calmer@eorinc.com
Project Location (Township, Range, Section), PIDs, and Address T115N, R22W, Section 23; PID 259230142; 4270 140th Street NE, Prior Lake, MN 55372	**Owner's Contact:** Name Pete Young, City of Prior Lake
Project size (acres) 0.04 acres	Phone 952-447-9831 E-mail pyoung@cityofpriorlake.com

PERMIT CATEGORY (check applicable type(s))

☐ Land Disturbance (C)	☐ Floodplain Alteration (F)	☐ Drainage Alteration (I)
☐ Stormwater Mgt (D)	☐ Wetland Alteration (G)	☐ Buffer Strips (J)
☐ Erosion & Sediment Ctrl (E)	☒ Bridge & Culvert Crossings (H)	☐ Other:_____

PROJECT DESCRIPTION

Two existing culverts constitute the outlet of Pike Lake and are part of the Prior Lake Outlet Channel. One culvert is a reinforced concrete pipe in good condition. The other culvert is a corrugated metal pipe that is severely degraded and must be replaced before it fails. The proposed project will replace the failing culvert with an equivalent culvert. The City worked with Emmons and Olivier Resources, the engineer for the PLSLWD, to design the project and to ensure that the replaced culvert will approximate existing flow conditions.

GENERAL CONDITIONS

1. The Permittee grants to the District, and its agents, employees, officers and contractors, a license to enter the Project to perform any inspections or work authorized by the Permit or any applicable law. This license shall expire after acceptance of the work by the District and issuance of a Certificate of Completion.

2. The Permittee shall indemnify, defend and hold the District and its agents, employees and officers harmless for all claims made by itself and third parties for damages or loss sustained or costs incurred, including engineering and attorneys' fees, as a result of issuance of the Permit or construction of the Project.

3. The Permittee shall provide the District with a Permit Fee Deposit in accordance with District requirements (see page 2). The Permit Fee Deposit will be held in escrow and used by the District to pay the actual costs incurred by the District, including engineering and legal fees, to process and review the Permit Application, to inspect and monitor the activities authorized by the Permit, and to ensure compliance with the District's rules. The Permittee shall fully pay all bills submitted to it by the District within seven days of receipt. Bills not so paid shall accrue interest at the rate of 8% per year.

4. The Permittee shall obtain such easements as may be required for construction of the Project and provide in the final plat for the Project utility and drainage easements acceptable to the District to protect all hydrologic features within the Project and to provide access for the maintenance of the stormwater management facilities to be constructed pursuant to the Permit.

5. To assure full compliance with the terms of the Permit, the Permittee shall deposit with the District a cash security or irrevocable letter of credit in a form and from a surety satisfactory to the District, in the amount specified under the Special Conditions of the Permit, once issued.

6. By acceptance of the Permit, Permittee acknowledges and agrees to perform and be bound by all general and special terms and conditions of the Permit.

CONTINUED ON NEXT PAGE

PRIOR LAKE - SPRING LAKE
WATERSHED DISTRICT

PERMIT APPLICATION, PAGE 2 OF 2

Prior Lake - Spring Lake Watershed District (PLSLWD)
4646 Dakota Street SE, Prior Lake, MN 55372, 952-447-4166

PROJECT NAME	APPLICATION #: (to be assigned)
Pike Lake Outlet Culvert Replacement	

Permit Fee Deposit - to be paid with your application:

Instructions: Calculate the required Permit Fee Deposit by totaling the amounts from items A through D below (as applicable). Include the Permit Fee Deposit with your application. Checks may be payable to the Prior Lake-Spring Lake Watershed District.

				Fill in amount here:
A) Grading or Alteration:				
less than one acre	$500			
1.0 to 4.99 acres	$1,000			
5.0 to 19.9 acres	$1,500			
20 acres or more	$2,000			n/a
B) Projects with Wetland or Flood Plain Areas	$1,000		+	n/a
C) Bridge or Culvert Crossing of a Waterbody or Ditch	$1,500	per crossing	+	n/a
D) Drainage Alterations	$1,500		+	n/a
Total Permit Fee Deposit due with application			=	$0.00

Permit Fee Deposit information and conditions:

1. The Permit Fee Deposit will be held in escrow and used to pay the District's costs for reviewing the application and administering the permit (if approved), including staff costs, and engineering and legal fees.

2. If at any time the Permit Fee Deposit falls below 25% of the original amount, the District shall notify the applicant to replenish the fee deposit to the original amount.

3. Upon application approval, a separate permit security escrow shall be required from the applicant prior to permit issuance.

4. Upon final completion of the project and the issuance of a Certificate of Completion by the District, the District shall return any unspent balance in the Permit Fee Deposit to the applicant, less a $10 application fee. The District does not pay interest on escrow deposits.

I hereby apply under District Rule B for a permit to complete the proposed project in accordance with the information submitted with this Application and the District's Rules, and I agree to the conditions on page one and two of this application.

Signature of Owner - Applicant	Your Name - please print	Date Submitted
	Pete Young	8/26/2020

Application Received	Permit Fee Deposit Amt	Received (y/n)	District Representative

technical memo

Project Name |	PLOC Pike Lake Park Crossing	**Date** |	April 3, 2019
To |	Pete Young, City of Prior Lake		
Cc |	Diane Lynch, PLSLWD District Administrator PLOC Cooperators		
From |	Carl K. Almer & Trevor Rundhaug		
Regarding |	East Culvert Replacement Guidance		

Purpose and Background

The purpose of this memorandum is to provide design guidance for one of the two culverts that presently act as the outlet control for Pike Lake. Drainage through Pike Lake – which is located along the Prior Lake Outlet Channel – is conveyed downstream through a 24" RCP and a deformed CMP approximately 35" high and 48" wide. In addition to being deformed, the latter is also degraded and in need of replacement. The City of Prior Lake requested that the District use the PLOC XPSWMM model to help provide insight into appropriate sizing of a replacement culvert.

Summary of Findings

Both a round ("RCP") and an arch ("RCAP") pipe were considered for the replacement, as an arch pipe would likely mimic the existing pipe capacity more closely than a round pipe. Culvert sizing was evaluated in two separate scenarios in order to (1) match the existing capacity of the outlet, and (2) comply with the design capacity requirements as laid out in the Prior Lake Outlet Channel (PLOC) Crossing Design Guidance:

> "For minor roads (i.e. collector and smaller), culverts must be designed to convey storm flow resulting from at least the 25-year, Atlas 14 precipitation event using a 24-hour, MSE 3 MN rainfall distribution, plus 65 cfs."

Constraints on the redesign included maintaining the existing inlet invert elevation and a minimum pipe cover of 12-inches. There is likely limited opportunity to raise the road profile without resulting in wetland impact.

Table 1 summarizes the sizes of the RCP and RCAP that would be required to meet or slightly exceed existing culvert capacity.

Table 1. Culvert Design Scenario 1: Match Existing Culvert Capacity

Scenario	Culvert Size	Full Flow Capacity (cfs)	Pike Lake 25-yr HWL* (ft)	Cover (ft)	Road Elevation Increase to Maintain 12-inch Freeboard (Yes/No)
Existing	35" x 48" (approx.)	~72	823.9	~1	-
RCP	33"	82	824.0	0.7	Yes (0.3 ft)
RCAP	36" equiv. (27" x 44")	88	824.1	1.4	No

* The minor increase in HWL is because of the shape of the existing culvert

Table 2 summarizes the sizes of the RCP and RCAP that would be required to comply with PLOC Crossing Design Guidance, which requires a culvert with capacity to convey the 25-year, 24-hr storm without overtopping the road crossing (823.8 feet).

Table 2. Culvert Design Scenario 2: Comply with PLOC Crossing Design Guidance

Scenario	Culvert Size	Pike Lake 25-yr HWL (ft)	Cover (ft)	Road Elevation Increase to Maintain 12-inch Freeboard (Yes/No)
Existing	35" x 48" (approx.)	823.9	1	-
RCP	42"	823.8	0	Yes (1.1 ft)
RCAP	42" equiv. (31" x 51")	823.7	0.8	Yes (0.1 ft)
RCAP[i]	42" equiv. (31" x 51")	823.7	0.9	No

[i] The inlet invert was lowered 0.1-feet from 820.0 to 819.9 to increase the cover. This is the invert elevation of the 24-inch RCP so there is no concern with respect to changing the existing runout elevation of the lake.

Table 3 summarizes the change in high water elevation for the 25-year, 24-hour storm and the 100-year, 24-hour storm for each design scenario. The maximum predicted downstream change in for these scenarios is a 0.4-feet increase at the Strauss driveway. The 42" equivalent RCAP with a lowered invert elevation is the only scenario predicted to prevent overtopping of the Strauss driveway during the 100-year, 24-hour storm.

Table 3. Change in Downstream Peak HWL for each Design Scenario.

Scenario	Change in 25-yr HWL (ft)				Change in 100-yr HWL (ft)			
	Pike Lake	Camp Kici Yapi	Strauss Driveway	Pike Lake Trail	Pike Lake	Camp Kici Yapi	Strauss Driveway	Pike Lake Trail
Road Elevation	823.8	823.9	815.6	818.7	823.8	823.9	815.6	818.7
Existing	823.9	822.9	813.5	811.5	824.7	824.2	815.6	812.8
33" RCP	+0.2	0.0	-0.1	0.0	+0.1	+0.1	+0.1	+0.1
36" equiv. RCAP	+0.1	0.0	-0.1	0.0	+0.1	+0.1	+0.1	+0.1
42" RCP	-0.2	+0.2	+0.4	+0.3	-0.1	0.0	+0.1	+0.1
42" equiv. RCAP	-0.2	+0.1	+0.2	+0.1	-0.3	-0.1	+0.1	+0.1
42" equiv. RCAP[i]	-0.2	+0.1	+0.2	+0.1	-0.1	-0.1	0.0	0.0

[i] Pipe invert lowered to 819.9 ft.

Recommendation

Based on this analysis and in order to meet the PLOC Crossing Design Guidance, our preliminary recommendation pending TAC/cooperator discussion regarding the impact of increased capacity is to install a 42" equivalent (31" x 51") RCAP to replace the degraded pipe.

CITY OF PRIOR LAKE

PIKE LAKE OUTLET CULVERT REPLACEMENT

PRIOR LAKE, SCOTT COUNTY, MINNESOTA

LEGEND

FEATURE	EXISTING	PROPOSED
SILT FENCE		SF
DELINEATED WETLAND	WET	
OVERHEAD ELECTRIC LINES	OHW	
BURIED ELECTRIC LINES	E-U	
FIBER OPTIC LINES	FO	
BURIED TELEPHONE	T-U	
CHAIN LINK FENCE	X X X X	
FEMA FLOOD PLAIN		
CONTOUR		
WETLANDS	WET	
SEDIMENT LOGS		

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
01	TITLE SHEET
02	PLAN & PROFILE
03	DETAILS

EXISTING UTILITIES

THE LOCATION OF UNDERGROUND FACILITIES AND/OR STRUCTURES AS SHOWN ON THE PLANS ARE BASED ON AVAILABLE RECORD AT THE TIME THE PLANS WERE PREPARED AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. THE SUBSURFACE UTILITY INFORMATION SHOWN IS UTILITY QUALITY LEVEL D, AS DETERMINED USING THE GUIDELINES OF "CI/ASCE 38-02 STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITIES 72 HOURS PRIOR TO CONSTRUCTION TO DETERMINE THE EXACT LOCATION OF ALL FACILITIES AND TO PROVIDE ADEQUATE PROTECTION OF SAID UTILITIES DURING THE COURSE OF WORK.

CONSTRUCTION NOTE

CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO MAINTAIN OPERATION OF EXISTING UTILITIES THROUGHOUT THE DURATION OF THE PROJECT. IN THE EVENT THAT AN INTERRUPTION OF SERVICE IS UNAVOIDABLE IN ORDER TO COMPLETE THE WORK, CONTRACTOR SHALL PROVIDE ADEQUATE NOTIFICATION TO ALL AFFECTED BUSINESSES A MINIMUM OF 3 WORKING DAYS IN ADVANCE OF ANY INTERRUPTION.

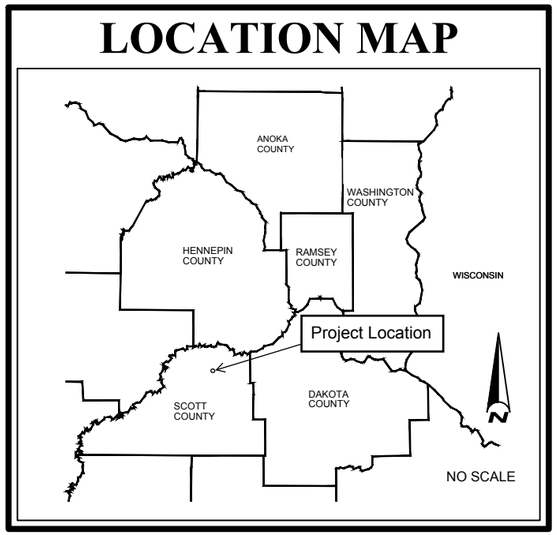
GOPHER STATE ONE-CALL

IT IS THE LAW THAT ANYONE EXCAVATING AT ANY SITE MUST NOTIFY GOPHER STATE ONE CALL (GSOC) SO THAT UNDERGROUND ELECTRIC, NATURAL GAS, TELEPHONE OR OTHER UTILITY LINES CAN BE MARKED ON OR NEAR YOUR PROPERTY BEFORE ANY DIGGING BEGINS. A 48-HOUR NOTICE, NOT INCLUDING WEEKENDS, IS REQUIRED. CALLS CAN BE MADE TO GSOC AT 1-800-252-1166 OR (651)454-0002, MONDAY THROUGH FRIDAY (EXCEPT HOLIDAYS) FROM 7 A.M. TO 5 P.M.

GSOC

811 Know what's below. Call before you dig.

LOCATION MAP



GOVERNING SPECIFICATIONS

THE 2018 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN

ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING FIELD MANUAL FOR TEMPORARY CONTROL ZONE LAYOUTS.

CLIENT
CITY OF PRIOR LAKE
4646 DAKOTA STREET SE
PRIOR LAKE, MN 55372

ENGINEER
EMMONS & OLIVIER RESOURCES, INC.
7030 6TH STREET NORTH
OAKDALE, MINNESOTA 55128-7534
TELEPHONE: (651) 770-8448
FAX: (651) 770-2552
eorinc.com

NO	DATE	BY	REVISION
6			
5			
4			
3			
2			
1	08/19/2019	KDC	FINAL BID PLANS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

KYLE D. CRAWFORD
DATE: 08/19/2019 LICENSE # 54906

SUBMISSION DATE: 08/19/2019
DESIGN BY KDC | DRAWN BY KDC
EOR PROJECT NO. 01376-0002

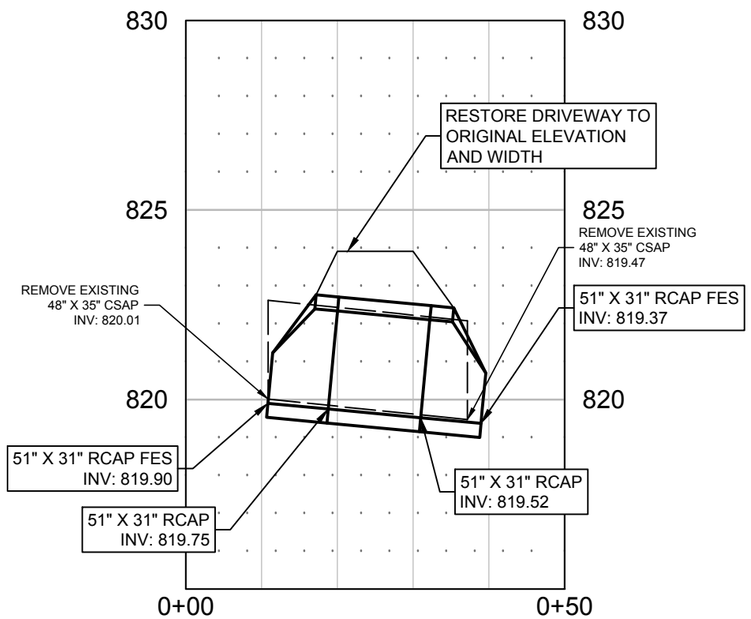
Emmons & Olivier Resources, Inc.
7030 6th Street North
Oakdale, MN 55128
Tele: 651.770.8448
www.eorinc.com
water ecology community

CITY OF PRIOR LAKE
4646 DAKOTA STREET SE
PRIOR LAKE, MN 55372

PIKE LAKE OUTLET CULVERT REPLACEMENT
PRIOR LAKE, SCOTT COUNTY, MINNESOTA
STATE PROJECT NO. ---
CITY PROJECT NO.

TITLE SHEET
SHEET 01 OF 03 SHEETS

Plot Date: 08/19/2019
Drawing name: X:\Clients_Municipal\01376_City_of_Prior_Lake\0002_Pike_LK_Outlet_Culvert\09_GIMS_ProjectName\dwg\1376-0002_CD.dwg
Xrefs: .xbase



GRADING & EROSION CONTROL NOTES

1. CONTRACTOR SHALL NOT COMMENCE WORK UNTIL FLOWS HAVE SUBSIDED TO ALLOW EASE OF REMOVAL AND INSTALLATION OF THE CULVERT AND LESSEN RISK OF SEDIMENTATION. CONTRACTOR SHALL NOTIFY CITY 48 HOURS PRIOR TO BEGINNING EXCAVATION.
2. CONTRACTOR TO ADHERE TO ALL CITY, WATERSHED, MNDOT PERMIT REQUIREMENTS. INCLUDING THE REQUIREMENT TO MINIMIZE THE AREA DISTURBED BY GRADING AT ANY GIVEN TIME AND TO COMPLETE VEGETATION RESTORATION WITHIN THE TIME REQUIRED BY THE PERMIT AFTER COMPLETION OF GRADING OF AN AREA.
3. ALL EXPOSED SOIL AREAS SHALL BE STABILIZED WITHIN 24 HOURS.
4. WHERE NECESSARY, INLET PROTECTION IS TO BE USED DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL MONITOR EROSION AND SEDIMENT MOVEMENT DURING CONSTRUCTION AND INSTALL EROSION AND SEDIMENT CONTROL MEASURES AS THEY BECOME NECESSARY.
6. REMOVE ALL EROSION CONTROL MEASURES AFTER THE WORK HAS BEEN COMPLETED AND VEGETATION ESTABLISHED.
7. THE CONTRACTOR SHALL REMOVE ALL SOILS AND SEDIMENT TRACKED ONTO EXISTING STREETS AND PAVED AREAS WITHIN 24 HOURS OF NOTICE. A CONSTRUCTION ENTRANCE SHALL BE INSTALLED IF TRACKING BECOMES AN ISSUE.
8. STOCKPILE TOPSOIL, GRANULAR FILL AND ROAD BASE MATERIAL ONSITE.
9. CONTRACTOR SHALL STRIP, STOCKPILE AND RE-SPREAD EXISTING ON-SITE TOPSOIL TO PROVIDE A UNIFORM THICKNESS OF AT LEAST 6 INCHES ON ALL DISTURBED AREAS TO BE SEEDED. THIS SHALL BE INCIDENTAL TO THE PROJECT.
10. FINAL GRADING TOLERANCES ARE ±0.1 FEET OF EXISTING SITE GRADES.
11. ALL EXCESS MATERIAL, BITUMINOUS SURFACING, CONCRETE ITEMS, ANY ABANDONED UTILITY ITEMS, AND OTHER UNSTABLE MATERIALS SHALL BE DISPOSED ON SITE PER CITY DIRECTION. DISPOSAL SHALL BE DONE IN A MANNER THAT MEETS ALL APPLICABLE REGULATIONS.
12. CONTRACTOR IS RESPONSIBLE FOR GRADING AND SLOPING THE FINISHED GROUND SURFACE TO PROVIDE SMOOTH & UNIFORM SLOPES.
13. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INCIDENTAL TO THE CONTRACT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BRING TO THE ENGINEER'S ATTENTION ADDITIONAL ITEMS FOR INSTALLATION.
14. SEEDING SHALL FOLLOW 2014 MNDOT SEEDING MANUAL.
15. ACCEPTABLE SEEDING DATES ARE APRIL 15 - JULY 20 IN THE SPRING, OR SEPTEMBER 20 - OCTOBER 20 IN THE FALL. WRITTEN PERMISSION MUST BE GRANTED BY THE ENGINEER TO PERFORM SEEDING OPERATIONS ON ANY OTHER DATE OF THE YEAR.

STORM SEWER NOTES

1. STORM SEWER REMOVAL AND INSTALLATION SHALL FOLLOW ALL APPLICABLE CITY OF PRIOR LAKE AND MNDOT SPECIFICATIONS (2018).
2. ALL PIPE JOINTS SHALL BE WRAPPED AND TIED PER CITY AND MNDOT SPECIFICATIONS.
3. CULVERT INVERTS SHALL BE ±0.05 FEET OF PLAN ELEVATIONS.

Item #	MnDOT Item No.	Item	Unit	Estimated	Notes
1	2021.501	Mobilization	LUMP SUM	1	
2	2104.501	Remove 42" CSAP	LS	1	1
3	2501.502	Storm Sewer, Class IV RCAP, 42"	LF	12	2
4	2501.502	RCAP Apron, 42"	EA	2	
5	2501.502	Footing for RCAP Apron, 42"	EA	2	
6	2511.504	Geotextile Filter, Type 4	SQ YD	80	
7	2511.507	Random Riprap, Class III	CU YD	34	3
8	2573.601	Temporary Erosion Control Allowance	ALLOW	1	4

SEQ NOTES

1. EXISTING CULVERT SHALL BE DISPOSED OF ONSITE AT THE DIRECTION OF THE CITY OF PRIOR LAKE.
2. EXCAVATION, PIPE BEDDING AND RESTORATION OF DRIVEWAY SHALL BE INCIDENTAL TO BID ITEM.
3. EXCAVATION AND DISPOSAL OF MATERIAL TO INSTALL RIPRAP APRONS SHALL BE INCIDENTAL TO BID ITEM. MATERIAL SHALL BE DISPOSED ONSITE AT THE DIRECTION OF THE CITY OF PRIOR LAKE.
4. ALLOWANCE IS ONLY INTENDED FOR EROSION AND SEDIMENT CONTROL MEASURES AS DEEMED NECESSARY BY THE CITY OF PRIOR LAKE. IF NO ESC MEASURES ARE UTILIZED, THIS ALLOWANCE WILL NOT BE PAID.

SCALE IN FEET

0 10 20 40

N

NO	DATE	BY	REVISION
6			
5			
4			
3			
2			
1	08/19/2019	KDC	FINAL BID PLANS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

KYLE D. CRAWFORD
DATE: 08/19/2019 LICENSE # 54906

SUBMISSION DATE: 08/19/2019
DESIGN BY KDC DRAWN BY KDC
EOR PROJECT NO. 01376-0002

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PIKE LAKE OUTLET CULVERT REPLACEMENT
PRIOR LAKE, SCOTT COUNTY, MINNESOTA
STATE PROJECT NO. --- CITY PROJECT NO.

PLAN & PROFILE
SHEET 02 OF 03 SHEETS

Plot Date: 08/19/2019
Drawing name: X:\Clients_Municipal\01376_City_of_Prior_Lake\0002_Pike_LK_Outlet_Culvert\09_GIMS_ProjectName\dwg\1376-0002_CD.dwg
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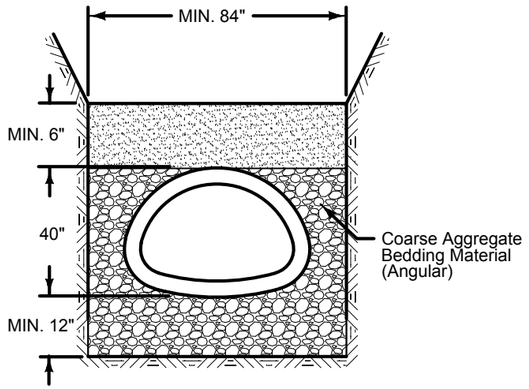
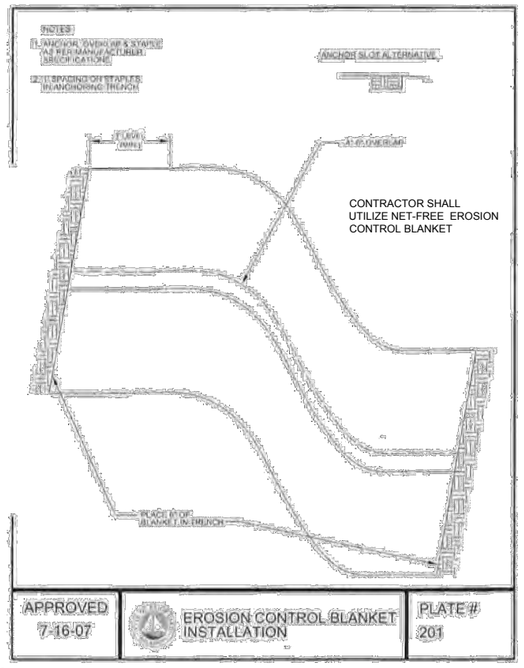
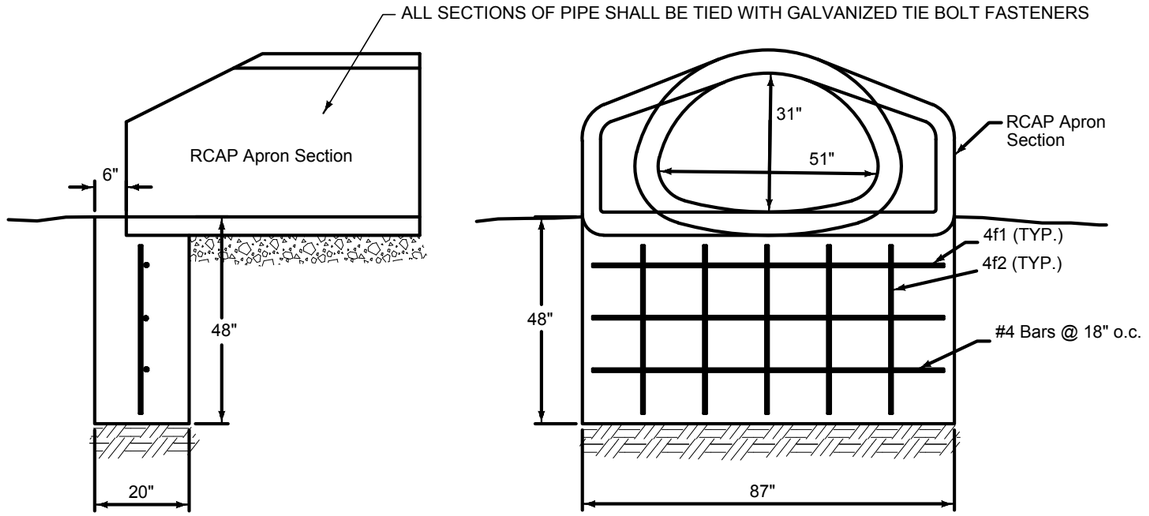


01/03 TYPICAL PIPE BEDDING
(NOT TO SCALE)



02/03 EROSION CONTROL BLANKET INSTALLATION
(NOT TO SCALE)



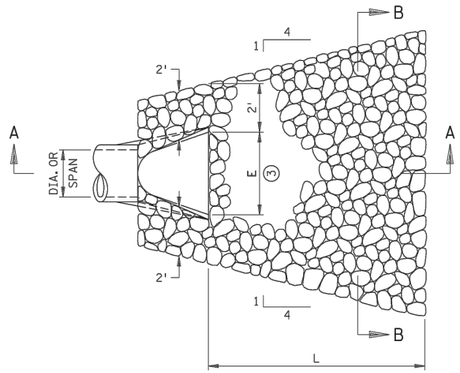
03/03 RCAP APRON FOOTING (INLET)
(NOT TO SCALE)

TABLE OF QUANTITIES
RIPRAP AT RCP OUTLETS

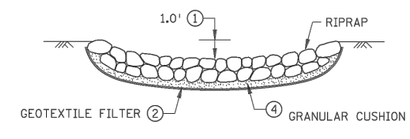
DIA. OF ROUND PIPE (IN.)	L (FT.)	CLASS II d_{50} = 6" GEO-TEXTILE FILTER (SQ.YD.)	CLASS II d_{50} = 6" GRANULAR FILTER UNDER APRON (CU.YD.)	CLASS II d_{50} = 6" 12" DEPTH RIPRAP (CU.YD.)	CLASS III d_{50} = 9" GEO-TEXTILE FILTER (SQ.YD.)	CLASS III d_{50} = 9" GRANULAR FILTER UNDER APRON (CU.YD.)	CLASS III d_{50} = 9" 18" DEPTH RIPRAP (CU.YD.)	CLASS IV d_{50} = 12" GEO-TEXTILE FILTER (SQ.YD.)	CLASS IV d_{50} = 12" GRANULAR FILTER UNDER APRON (CU.YD.)	CLASS IV d_{50} = 12" 24" DEPTH RIPRAP (CU.YD.)
12	8	16.9	0.2	3.0	19.6	0.3	4.4	22.6	0.3	5.9
15	8	18.0	0.2	3.2	20.8	0.3	4.8	23.9	0.4	6.4
18	10	22.4	0.3	4.3	25.6	0.4	6.4	29.0	0.5	8.5
21	10	24.1	0.4	4.7	27.4	0.6	7.1	30.9	0.7	9.4
24	12	29.7	0.5	6.2	33.4	0.8	9.2	37.3	1.0	12.3
27	12	31.4	0.6	6.6	35.2	0.9	9.9	39.2	1.2	13.2
30	14	37.4	0.8	8.2	41.6	1.1	12.3	46.0	1.5	16.4
36	16	45.9	1.1	10.6	50.5	1.6	15.8	55.4	2.1	21.1
42	18	52.8	1.2	12.5	57.8	1.7	18.7	63.0	2.3	24.9
48	20	61.1	1.5	14.8	66.5	2.2	22.2	72.0	2.9	29.6

TABLE OF QUANTITIES
RIPRAP AT RCP-A OUTLETS

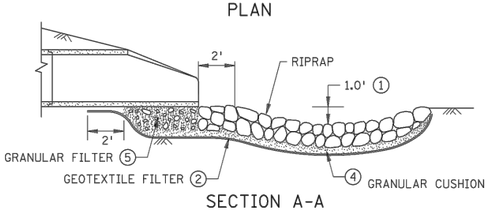
SPAN OF PIPE ARCH (IN.)	L (FT.)	CLASS II d_{50} = 6" GEO-TEXTILE FILTER (SQ.YD.)	CLASS II d_{50} = 6" GRANUL FILTER UNDER APRON (CU.YD.)	CLASS II d_{50} = 6" 12" DEPTH RIPRAP (CU.YD.)	CLASS III d_{50} = 9" GEO-TEXTILE FILTER (SQ.YD.)	CLASS III d_{50} = 9" GRANUL FILTER UNDER APRON (CU.YD.)	CLASS III d_{50} = 9" 18" DEPTH RIPRAP (CU.YD.)	CLASS IV d_{50} = 12" GEO-TEXTILE FILTER (SQ.YD.)	CLASS IV d_{50} = 12" GRANUL FILTER UNDER APRON (CU.YD.)	CLASS IV d_{50} = 12" 24" DEPTH RIPRAP (CU.YD.)
22	10	22.4	0.3	4.1	25.6	0.4	6.1	29.0	0.5	8.1
28	12	29.5	0.5	5.7	33.2	0.7	8.5	37.1	0.9	11.3
36	14	37.3	0.8	7.5	41.5	1.1	11.2	45.8	1.5	14.9
43	16	45.9	1.1	9.5	50.5	1.6	14.3	55.3	2.1	19.0
51	18	52.5	1.2	11.3	57.5	1.7	16.9	62.7	2.3	22.5
58	20	59.9	1.3	13.2	65.2	1.9	19.8	70.7	2.5	26.4



PLAN



SECTION B-B



SECTION A-A

NOTES:
REQUIREMENTS FOR GEOTEXTILE TYPE, RIPRAP SIZE AND THICKNESS WILL BE DESIGNATED IN THE PLANS.

PIPE SIZES LARGER THAN THOSE SHOWN REQUIRE A SPECIAL DESIGN.

1. FOR PIPES GREATER THAN OR EQUAL TO 30", USE 1.5'.
2. GEOTEXTILE FILTER, SPEC. 3733, SHALL COVER THE BOTTOM AND SIDES OF THE AREA EXCAVATED FOR THE RIPRAP, GRANULAR FILTER MATERIALS.
3. DIMENSION E IS GIVEN ON STANDARD PLATES 3100 AND 3110.
4. GRANULAR FILTER, SPEC. 3601, MAY BE USED AS A CUSHION LAYER. PLACE FILTER PER SPEC. 2511. THE CUSHION LAYER IS INCIDENTAL.
5. GRANULAR FILTER OR RIPRAP, SPEC. 3601, TO EXTEND UNDER ENTIRE OPEN PORTION OF PIPE APRON. DEPTH OF MATERIAL UNDER APRON SHALL MATCH RIPRAP DEPTH. WHEN USING RIPRAP INCREASE RIPRAP QUANTITY ACCORDINGLY AND PLACE A 3" LAYER OF 1.5" CRUSHED ROCK UNDER THE APRON TO AID IN GRADING FOR APRON PLACEMENT. CRUSHED ROCK IS INCIDENTAL.

APPROVED DECEMBER 9, 2013
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

RIPRAP AT RCP OUTLETS

SPECIFICATION REFERENCE: 3100, 3110, 3601, 3733, 2511

STANDARD PLATE NO. 3133D

04/03 RIPRAP AT PIPE OUTLETS
(NOT TO SCALE)

NO	DATE	BY	REVISION
6			
5			
4			
3			
2			
1	08/19/2019	KDC	FINAL BID PLANS

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

KYLE D. CRAWFORD
DATE: 08/19/2019 LICENSE # #####

SUBMISSION DATE: 08/19/2019
DESIGN BY KDC DRAWN BY KDC
EOR PROJECT NO. 01376-0002

Emmons & Olivier Resources, Inc.
7030 6th Street North
Oakdale, MN 55128
Tele: 651.770.8448
www.eorinc.com

CITY OF PRIOR LAKE
4646 DAKOTA STREET SE
PRIOR LAKE, MN 55372

PIKE LAKE OUTLET CULVERT REPLACEMENT
PRIOR LAKE, SCOTT COUNTY, MINNESOTA
STATE PROJECT NO. --- CITY PROJECT NO.

DETAILS
SHEET 03 OF 03 SHEETS

PLSLWD Board Staff Report
September 1, 2020

Subject |	CAC Member Application for Ben Burnett	
Board Meeting Date |	September 10, 2020	**Item No**
Prepared By |	Kathryn Keller-Miller	
Proposed Motion |	Approve CAC membership application for Ben Burnett	

Background

The District's Citizen Advisory Committee (CAC) is composed of residents of the watershed district and advises the Board of Managers on topics relevant to the District. The CAC reviews applications for new members and provides a recommendation for membership to the Board.

Discussion

Upon review of the application for Ben Burnett, the CAC feels that Mr. Burnett would be a valuable addition to the CAC.

Recommendation

The CAC and staff recommend that the Board move to approve the application of Ben Burnett for membership to the CAC.

PRIOR LAKE SPRING LAKE WATERSHED DISTRICT

CITIZEN ADVISORY COMMITTEE APPLICATION

Name:	Ben Burnett
Address:	3040 Creekview Cir SW Prior Lake, MN 55372
Phone:	952-226-3951 cell: 952-491-3786
E-mail:	burnettb317@gmail.com
Occupation:	Programmer / Project Manager / R&D Computer Scientist
Employer:	ATCorp http://www.atcorp.com
Employer's Address:	9971 ValleyView Rd Eden Prairie, MN 55344
How long have you lived in the District?	19 yrs, Since June 2001

Please state briefly why you are interested in serving on the Citizen Advisory Committee:

The creek between Spring Lake and Prior Lake goes through my backyard and I'm interested in learning more about the water issues as well as helping to maintain and improve water quality throughout the Prior Lake-Spring Lake Watershed District.

What focus area would you like to volunteer to assist the CAC with in 2020?

- Shoreline Restoration (Water Quality) _**X**__
- Fish Stocking (Water Quality & AIS) __**X**_
- Storage Assessment, Plans & Wetland Banking (Reduce Flooding) _**X**__
- Grants/Fundraising (Administration) ____
- 50th Anniversary (Administration & Water Quality)____
- Bylaws Update (Administration)____
- Other ideas you would like the CAC to consider____

Conflict of interest is defined as the participation in any activity, recommended action, or decision from which the individual has or could have the potential to receive personal gain, whether it be direct or indirect. In accordance with this definition, do you have any legal or equitable interest in any business, however organized, which could be construed as a conflict of interest?

Yes ___ No _**X**_ If yes, please provide details:

Are you related to any Watershed District Board Member or to any member on the Citizens Advisory Committee? If so, give name and relationship.

No

Other qualifications, experience, information or comments you would like to submit.

I am a Federal DoD contractor doing project management for million+ dollar contracts, overseeing research and development efforts. I have experience managing budgets, projects, and people.

I'm involved with research and development and often have to read academic papers and professional research to quickly get an understanding of new technologies and findings to develop new ideas and apply to current problems and projects. I believe this would be useful for water and watershed issues as well.

PERSONS WITH DISABILITIES ARE ENCOURAGED TO APPLY

RETURN THIS COMPLETED APPLICATION FORM TO:

Diane Lynch
Prior Lake-Spring Lake Watershed District
4646 Dakota Street SE
Prior Lake, MN 55372
dlynch@plslwd.org
(952) 440-0067

This application will be kept on file for 12 months.

REGULAR MEETING MINUTES

Thursday, August 13, 2020
Prior Lake City Hall
6:00 PM

Members Present:	Mike Myser, Curt Hennes, Steve Pany, Frank Boyles & Bruce Loney
Staff & Consultants Present:	Diane Lynch, District Administrator Maggie Karschnia, Project Manager Jaime Rockney, Water Resource Specialist Kathryn Keller-Miller, Water Resources Assistant Carl Almer, EOR, District Engineer
Others Present:	Brian Kallio, Wenck Associates, Inc. Anne Wilkinson, Wenck Associates, Inc. Woody Spitzmueller, CAC

- **CALL TO ORDER/PLEDGE OF ALLEGIANCE, OATH OF OFFICE FOR NEW MANAGER FRANK BOYLES:**
  Meeting called to order by President Myser at 6:00 PM.

- **2.0 PUBLIC COMMENT**: None

- **3.0 APPROVAL OF AGENDA**
  Manager Loney moved to approve the agenda. Second by Manager Hennes. All ayes. Motion passed 5-0.

OTHER OLD/NEW BUSINESS

- **4.1 INTERN UPDATE**
  Shauna Capron and Katelyn Barclay, summer interns, presented on their time with the District. Shared what project they worked on, what they learned and what they will take with them in their future endeavors.

- **4.2 PROGRAMS & PROJECT UPDATES**
  Staff gave updates on current and ongoing District projects and activities, focusing on Water Quality, Upper Subwatershed Storage and AIS.

- **4.3 IPM PLAN STATUS**
  Maggie Karschnia gave a update on the Integrated Pest Management program. Discussion only. No vote taken.

- **4.4 UPPER WATERSHED BLUEPRINT UPDATE**
  Brian Kallio, Wenck, gave an update on the project. Discussion only. No vote taken.

- **4.5 FISH STOCKING PLAN RECOMMENDATION**
  Manager Loney moved to approve the fish stocking recommendation given by Maggie Karschnia. Second by Manager Pany. Program to be funded by $6,340 to be transferred from 652 MS4 Education Program and $2,000 each from the Spring Lake and Prior Lake Associations. All ayes. Motion passed 5-0.

- **5.0 APPROVAL OF CONSENT AGENDA**
  Manager Hennes moved to approve the Consent Agenda after adding a WaterGuards invoice to the Claims List. Second by Manager Boyles. All ayes. Motion passed 5-0.

- **6.0 TREASURER REPORT/FINANCIAL REPORT**
  Manager Loney summarized the Treasurer's Report and provided updates on District finances.

- **7.0 MANAGER PRESENTATIONS ON WATERSHED RELATED ITEMS**
  Discussion only. No vote taken.

- **8.0 UPCOMING MEETINGS/EVENTS**
  - CAC Meeting, Thursday, August 27, 6:30 – 8:00 PM

ADJOURNMENT

Manager Hennes moved to adjourn meeting. Second by Manager Pany. All ayes. Motion passed 5-0. Meeting adjourned at 7:50 PM.

_____

Steve Pany, District Secretary

PRIOR LAKE-SPRING LAKE WATERSHED DISTRICT

WORKSHOP MEETING MINUTES

Tuesday, August 13, 2020

Prior Lake City Hall, Parkview Room

Members Present:	Curt Hennes, Charlie Howley, Bruce Loney & Mike Myser
Staff Present:	Diane Lynch, District Administrator
Others Present:	Frank Boyles, future Board Manager; Carl Almer, EOR; Pete Young, Prior Lake; Glenn Kelley, Spring Lake Township; Woody Spitzmueller, CAC and Jim Fitzsimmons, Scott SWCD

The meeting was called to order by President Mike Myser at 4:00 p.m.

2021 Draft Budget

Diane Lynch reviewed the draft budget and staff memo. Managers discussed the requirements for education and outreach; potential need to issue a bond and possibly change the budget codes re. capitol projects and their budget priorities. There was a consensus to keep the levy at $1.794, which is the same as it has been since 2018.

Working Together with the CAC

Managers Myser and Loney discussed Board expectations of the CAC.

Catch Basins, Street Sweeping.

Pete Young and Manager Loney discussed a possible Public Infrastructure Partnership project to be budgeted at $20,000 in 2021. Mr. Young was asked to put together a more detailed memo for consideration at the September Board Workshop.

Treasurer's Report Format

Manager Loney asked if the managers supported his revised Report format. They did.

Discuss and Approve Liaison Appointments

Manager Boyles will be the liaison for the City of Prior Lake Council meetings and CEC. Manager Pany will be the liaison for the Lower Minnesota Watershed District.

Updates

FEMA. Diane Lynch is working with HSEM so that the Downed Trees and Sediment Delta reimbursement request can be made to FEMA ASAP. **Upper Prior Alum Treatment**. The District has received its grant reimbursement for the Upper Prior Alum Treatment from the Board of Soil and Water Resources. **Sutton Lake.** Diane reported that she is working with the District attorney to pull together legal documents so the property owners can sign the easements. **Financial System.** The Board will check back on this at the end of the year. **Fall Tour.** The managers would like a fall tour after the UW Blueprint is mostly complete so they have an idea of where projects could be.

The meeting was adjourned at 5:50 p.m.

Citizen Advisory Committee

Meeting Minutes

Thursday August 27, 2020

6:30-8:00 p.m.

Parkview

Attendees:

- **CAC Members present:** Christian M, Christopher C, Matt N, Jim W
- **Others present:** District Staff: Kathryn K-M; Board Members: Curt H; Guest: Ben Burnett (potential new member)

I. **Call meeting to order 6:30 pm** – Chair Christian Morkeberg

II. **Agenda-Additions-Approval of Agenda & July 2020 meeting minutes**.

a. Agenda approved with additions:

i. Discussion of possible new CAC member, Ben Burnett

ii. Lake vegetation on Spring Lake (Jim W)

b. July meeting minutes approved

III. **CAC Business**

a. New member application for Ben Burnett

i. Ben Burnett gave brief introduction of himself. Lives on the creek that connects Spring and Prior Lakes. Interested in water quality issues and wanted to get more involved. Has a background with 4H. In his professional life he started as a computer programmer and is now a project manager who works in R&D on a lot of defense contracts. He is used to learning about new things quickly and doing research. He doesn't get out on the lake much because he doesn't have a boat but mostly appreciates the nature and wildlife along the creek, visits the beach with his family.

ii. CAC voted to recommend Ben Burnett to the Board of Managers for addition to the CAC.

b. Communication with the Board of Managers

i. Christopher – found guidelines helpful

ii. Jim – communication should go two ways. How does Board communicate things they want feedback on with the CAC? Several CAC members would like formal method for this.

1. Some board members direct questions to Christian

2. Bruce should be the communicator since he is the Board's liaison to the CAC. Will add a spot to the CAC agenda for Bruce to provide updates from the Board and ask for feedback from the CAC.

iii. Communications structure approved by CAC.

c. 2021 Budget

i. Special board workshop to discuss budget – open to the public. **Sept 9, 4:00-7:30 pm**

ii. CAC had no additional budget requests

d. Boat traffic

i. No big updates. Not a lot of appetite for City ordinance to limit boat traffic on the lake. Matt reported that Fish Lake has had a lot of extra boat traffic, including from the

campground this year. Both Matt and Christopher reported that there was a significant drop in the boat traffic on Fish Lake and Spring Lake, respectively, in the last week or two.

ii. Jim talked to someone from the DNR who said that the DNR doesn't have a position on regulating boat traffic as they have deemed it a local issue.

e. Matt brought up an additional issue to look into regarding using bacteria cultures to eat up excess nutrients in lakes and ponds to clear up water quality. The original research was on ponds and use originated in waterwater treatment plants. Take natural cultures out of lakes, grow them in a lab and return them to the lake. Comes in pellet form (for homeowners) and liquid form. Approval is state by state. Some types are approved in MN but approval for use on lakes is more unclear. The bacteria eat up nutrients and convert them to gases. Often called "muck digesters." Used to be relatively cheap but price has gone up as marketing has taken off. Are high and low temp varieties available. Need to be careful of fish kills in some locations because the bacteria use oxygen and could deplete water oxygen levels. Bacteria can eat up muck on lake and pond bottoms. Bacteria generally dies off when water temperatures are below 55^{o}F. Can see effect in about 3 weeks. Matt noted that on Fish Lake many homeowners treated curlyleaf pondweed. However, the chemicals used contained copper that killed lake bacteria so the vegetation that died off wasn't being broken down and lake bacteria needed to be rebalanced. Matt could present more on the bacterial cultures at next CAC meeting.

IV. **August Board meeting update –** Woody (sent summary to Christian ahead of time)

a. Board discussed the 2021 budget; communication with the CAC; Sutton Lake project, hope to start this fall, still need to complete easements; upper watershed blueprint update; summer interns finished and gave presentation; update on fish stocking.

b. **September Board Meeting attendee –** Ben

V. **Staff Project Updates**

a. Hike the Watershed going well, was highlighted by the local newspaper. Jim said his coffee group has been rotating between the parks. Christian noted that the prairie flowers by Arctic Lake are beautiful right now and urged everyone to check it out.

VI. **Subcommittee Reports**

a. **50th Anniversary** (Kim)

i. Hike the Watershed highlighted by local newspaper. Curt complemented the 50th anniversary initiatives including the brochure and Hike the Watershed.

b. **Fish Stocking** (Christian)

i. Stocking was approved at the August Board meeting. Will be stocking bluegills and walleye for Spring and Prior Lakes. The stocked walleye will be larger than the ones the DNR stocks. Rotary is in favor of funding but won't approve funds until October meeting. Spring Lake Association upped their contribution to $2000. PLA is contributing $2000.

c. **AIS/Signage** (Jodi)

i. Christian, Curt and Diane met with Eric from the company that makes I-LIDS. I-LIDS would be paired with communication with the community. Can be combined with inspectors as well. I-LIDS would be supplemental to other efforts. Cost of I-LIDS would be low compared with costs if lake becomes infested with new AIS. Could make sense to do test site at Spring Lake launch due to AIS currently in (and not in) the lake, though argument could be made for Prior Lake because it is busier. Can use I-LIDS to identify launch patterns and use this to better schedule inspectors. Possible to offer funding to sheriff to pursue violations? How many violations would be sent their way? Some inspectors are good, but others are very passive and not willing to confront people. SLA just posted about boat inspections on Facebook. Could also put together tools for boats to use at launches to clean their boats. CAC keep working on AIS and put together a recommendation to present to the Board.

d. **Shoreline Restoration** (Christopher, Matt)
    i. No updates. Christian send them some materials to review.
e. **Storage Assessment, Plans and Wetland Banking** (Woody, Jim, Christopher)
    i. Waiting for engineering report from upper watershed blueprint.

VII. **Goals & Topics for Upcoming Meeting**

a. Update of Upper Watershed Blueprint
b. Quick review of budget
c. Further discussion on lake bacteria that Matt discussed
d. Update from Steve McComas on lake vegetation
e. Continued discussion of AIS prevention strategies and I-LIDS

VIII. **Staff & Other Announcements**

IX. **Adjourn** – 8:04 pm

9/10/2020

Prior Lake Spring Lake Watershed District
Claims list for Invoice Payments due for the prior month

Managers will consider approving this claims list - Staff payroll and Manager per diems have already been paid via ADP.
After the managers vote, two Managers will sign checks within three days of the meeting for approve claims.
Then, staff will US mail checks (written on the Old National Bank) to the claims list parties.
Staff will request that all vendors provide information on their invoices to fit into the categories below

UPDATED 9/3/2020

Vendor	Invoice	Description	Amount
1. Watershed District Projects (excluding staff payroll)			
Applied Ecological Services	2973	County 12 Wetland Maintenane	1,904.00
EOR	00758-0019	Sutton Lake Outlet Modification	456.25
EOR	00758-0018	General Engineering	852.50
EOR	00758-0019	Permitting	1,565.25
EOR	00758-0018	District Plan Update	1,100.50
EOR	00758-0136	Upper Watershed Blueprint	426.25
EOR	00758-0135	PCSWMM Update	5,307.75
EOR	00758-0124	Spring Lake West Subshed BMP Feasibility	164.00
Evergreen Equipment, LLC	2667	FeCl Weir Improvement	61,581.50
RMB	514328	Lab Analysis	441.00
RMB	513672	Lab Analysis	474.00
RMB	513676	Lab Analysis	450.00
RMB	509945	Lab Analysis	294.00
Smith Partners	41791	Water Resources Mgmt Plan	1,934.01
WSB	R-015516-000 16	Carp Management	840.00
WSB	R-015516-000 15	Carp Management	22,312.58
Xcel Energy	698220620	August	17.29
		Subtotal	**100,120.88**
2. Outlet Channel - JPA/MOA (excluding staff payroll)			
Barr Engineerging	23701065.00 17	FEMA Channel Stabilization	3,169.50
EOR	00758-0131	PLOC Engineering Assistance	2,157.97
HG & K		August PLOC	1,168.75
		Subtotal	**6,496.22**
3. Payroll, Office and Overhead			
ADP Manager Per Diems		Already Paid	655.78
ADP Staff Payroll		Already Paid	22,425.90
ADP Taxes & Benefits		Already Paid	13,611.16
City of Prior Lake	1402	Key Card	5.00
Connexus Credit Union		Health Savings Account	205.38
H SA Bank		Health Savings Account	415.38
HG & K		August Accounting	2,461.25
Metro Sales	1654977	Copy Machine Contract	110.60
Metro Sales	1652784	Quarterly Adjustment	546.03
NCPERS		Life Insurance	96.00
Optum Bank	95-100059572	Health Savings Account	45.00
VISA		August Charges	880.62
		Subtotal	**41,458.10**
4. Debt repayment and Interest			
Northland Trust Services		Principal	
Northland Trust Services		Interest	
Northland Trust Services		Agent Fee	
		Subtotal	**0.00**

TOTAL **148,075.20**

X_____ X_____

Reflects bills paid through August 31, 2020

Program Element		2020 Source of Funds			2020 Expenditure Budget	Actual Results		
		2020 Levy	Budget Reserve	Grant Funds/Fees		Monthly Paid Expenses	YTD Paid Expenses	Percent Spent
	Administrative Salaries and Benefits	150,799			150,799	11,136	65,235	
	703 · Telephone & Internet	15,400			15,400	528	6,864	
	706 · Office Supplies	8,690			8,690	487	4,280	
	709 · Insurance and Bonds	8,500			8,500	-	9,307	
	670 · Accounting	25,900			25,900	1,458	21,742	
	671 · Audit	10,250			10,250	-	8,065	
	903 · Fees	1,200			1,200	14	1,587	
	660 · Legal (not for projects)	5,000			5,000	-	1,028	
	Administration	**225,739**			**225,739**	**13,623**	**118,107**	**52.32%**
	Program Salaries and Benefits (not JPA/MOA)	**340,202**			**340,202**	**30,912**	**250,497**	**73.63%**
Water Qual	550 Public Infrastructure Partnership Projects	-			-	-	474	
Water Qual	611 Farmer-led Council	51,000			51,000	925	4,026	
Water Qual	611 Cost-Share Incentives	58,000			58,000	19,741	19,741	
Water Qual	611 Highway 13 Wetland, FeCl system & Desilt, O&M	57,800			57,800	7,032	19,504	
Water Qual	611 Fish Point Park Retrofits	2,000			2,000	-	-	
Water Qual	611 Fish Management, Rough Fish Removal	35,805	6,340	4,000	46,145	12,039	67,205	
Water Qual	611 Spring Lake Demonstration Project Maintenance	1,500			1,500	-	-	
Water Qual	611 Raymond Park Maintenance	2,000			2,000	-	9	
Water Qual	611 Alum Internal Loading Reserve	148,500	458,819	449,500	1,056,819	14,152	1,045,083	
Water Qual	611 County Rd 12/17 Maintenance	5,000			5,000	-	-	
Water Qual	611 FeCl carp barrier tine replacement project	26,000	64,544		90,544	-	8,888	
Water Qual	611 Indian Ridge Maintenance	1,500			1,500	-	-	
Water Qual	611 Fairlawn Shores Maintenance	1,500			1,500	-	-	
Water Qual	611 Fish Lake TMDL Implementation	-	3,000		3,000	-	-	
Water Qual	611 Pike Lake TMDL Implementation	-	3,000		3,000	-	-	
Water Qual	611 Feasibility Reports	-			-	41	24,431	
Water Qual	637 District Monitoring Program	87,100			87,100	2,413	6,626	
Water Qual	GRANT Carp Management/Removal	150,000		90,000	240,000	32,659	142,104	
Water Qual	626 Planning and Program Development	32,000			32,000	147	10,234	
Water Qual	626 LGU Plan Review	3,000			3,000	-	2,708	
Water Qual	626 District Plan Update	-	50,000		50,000	382	27,797	
Water Qual	626 Engineering not for programs	30,000			30,000	222	4,707	
Water Qual	648 Permitting and Compliance	12,000			12,000	2,303	11,253	
Water Qual	648 Update MOAs with cities & county	5,000			5,000	-	-	
Water Qual	648 BMP and easement inventory & inspections	10,000			10,000	54	3,565	
Water Qual	626 Comprehensive Wetland Plan Update	-			-	-	-	
Water Qual	626 Boundary Change Exploration	-			-	-	194	
Water Qual	648 Non-project Reg. Reporting, Rules & Stand. Rev.	-			-	-	11,051	
Water Qual	611 Identify and Mitigate Channel Erosion	-			-	-	-	
Water Qual	626 Upper Watershed Blueprint	27,500	62,500		90,000	8,623	11,175	
	WQ TOTAL	**747,205**	**648,203**	**543,500**	**1,938,908**	**100,734**	**1,420,774**	**73.28%**
Water Storage	550 District-wide Hydraulic & Hydrologic model	16,000		16,000	32,000	17,534	25,454	
Water Storage	550 Storage & Infiltration Projects--Sutton Lake	143,641	63,359	207,000	414,000	3,602	18,733	
Water Storage	626 Develop an Upper WS Storage Projects Plan	-			-	-	-	
	WS TOTAL	**159,641**	**63,359**	**223,000**	**446,000**	**21,136**	**44,187**	**9.91%**
AIS	611 Aquatic Vegetation Mgmt	-		6,000	6,000	-	5,466	
AIS	637 Automated Vegetation Monitoring	4,700			4,700	57	2,757	
AIS	637 Aquatic Vegetation Surveys	20,000			20,000	-	-	
AIS	637 Boat inspections on Spring, Upper & Lower Prior	20,000			20,000	9,632	15,811	
	AIS TOTAL	**44,700**	**-**	**6,000**	**50,700**	**9,689**	**24,034**	**47.40%**
Ed & Out	652 MS4 Education program	-	3,660		3,660	-	-	
Ed & Out	652 Prior Lake-Savage Schools partnerships	250			250	-	-	
Ed & Out	652 CAC Training & Supplies	2,500			2,500	-	-	
Ed & Out	652 Educational signs	2,000			2,000	-	-	
Ed & Out	652 50th Anniversary projects	5,000			5,000	94	145	
	E&O TOTAL	**9,750**	**3,660**	**-**	**13,410**	**94**	**145**	**1.08%**
	PLOC Restoration, Maintenance & Monitoring	**90,220**			**90,220**	**-**	**90,220**	**100.00%**
	Bond Payments	**177,175**			**177,175**	**-**	**350,917**	**198.06%**
	Total excluding PLOC expenses	**1,794,632**	**715,222**	**772,500**	**3,282,354**	**176,189**	**2,298,880**	**70.04%**
	PLOC expenses				**380,750**	**20,786**	**71,728**	**18.84%**

	Grant Funds/Fees Anticipated				
Water Qual	**611 Farmer-led Council (SWCD)**			10,000	10,000
Water Qual	**648 Permitting and Compliance**			1,000	1,000
Water Qual	**648 BMP and easement inventory & inspections**			1,000	1,000
Water Storage	**637 District-wide Hydraulic & Hydrologic Model (PLk)**			-	-
AIS	**611 Aquatic Vegetation Mgmt. (Scott County)**			-	-
Water Storage	**550 Storage & Infiltration Projects (Sutton Lake) DNR**			-	-
Water Qual	**611 Fish Management, Rough Fish Removal**			-	-
	Total Grant Funds/Fees Anticipated			**12,000**	**12,000**

No assurance is provided on this statement.
This statement omits required disclosures.
This statement is prepared on the cash basis of accounting.

Prior Lake Spring Lake Watershed District
Cash Flow projections

BEST CASE **BEST CASE**

Expected Cash Flow

2020

	May	June	Jul	Aug	Sep	Oct	Nov	Dec
	Actual	Actual	Actual	Actual				
Monthly Cash Checking								
Cash start	$ 445,661	$ 136,998	$ 590,600	$ 468,681	$ 542,027	$ 367,619	$ 273,619	$ 163,619
Expenses	$ 308,663	$ 710,675	$ 384,585	$ 219,785	$ 174,407	$ 210,000	$ 210,000	$ 417,000
Revenues	$ -	$ 1,164,277	$ 11,222	$ 293,131	$ -	$ 16,000	$ -	$ 1,317,979
Cash from Investments	$ -	$ -	$ 251,444	$ -	$ -	$ 100,000	$ 100,000	$ -
Cash Checking end	**$ 136,998**	**$ 590,600**	**$ 468,681**	**$ 542,027**	**$ 367,619**	**$ 273,619**	**$ 163,619**	**$ 1,064,598**

Expense Detail								
					Claims list			
Typical Monthly Budget (not including large capital projects - Alum & Sutton Lake)	$ 105,663	$ 154,804	$ 112,833	$ 181,245	$ 167,911	$ 170,000	$ 170,000	$ 170,000
PLOC expenses	$ 3,000	$ 10,005	$ 8,819	$ 20,786	$ 6,496	$ 40,000	$ 40,000	$ 40,000
Alum Spring	$ 200,000		$ 262,319	$ 14,152				
Alum Upper Prior		$ 542,375						
Sutton Lake		$ 3,491	$ 614	$ 3,602				$ 207,000
Total Expenses	$ 308,663	$ 710,675	$ 384,585	$ 219,785	$ 174,407	$ 210,000	$ 210,000	$ 417,000

Revenue Detail								
Levy		$ 922,861		$ 36,313				$ 672,987
Misc/Other		$ 12,673	$ 956					
BWSR Alum Grant		$ 224,750		$ 224,750				
Sutton Lake Grant								
Grants - Other		$ 2,000	$ 10,266	$ 32,068		$ 16,000		
FEMA		$ 1,994						$ 644,992
Total Revenue	$ -	$ 1,164,277	$ 11,222	$ 293,131	$ -	$ 16,000	$ -	$ 1,317,979

Monthly Northland Investments								
Starting balance	$ 629,670	$ 630,060	$ 629,767	$ 378,188	$ 377,909	$ 378,209	$ 278,509	$ 178,809
Additions	$ 390	$ (293)	$ (135)	$ (279)	$ 300	$ 300	$ 300	$ 200
Reductions	$ -	$ -	$ (251,444)	$ -	$ -	$ (100,000)	$ (100,000)	$ -
Northland account end	$ 630,060	$ 629,767	$ 378,188	$ 377,909	$ 378,209	$ 278,509	$ 178,809	$ 179,009

Notes:

Levy revenue assumptions:	June	actual collection
	December	75%
FEMA Reimbursement assumption:	December	2020
2020 Levy amount		1,794,632

Prior Lake Spring Lake Watershed District
Cash Flow projections

WORST CASE **WORST CASE**

Worst Case Cash Flow

2020

	May Actual	June Actual	Jul Actual	Aug Actual	Sep	Oct	Nov	Dec
Monthly Cash Checking								
Cash start	$ 445,661	$ 136,998	$ 590,600	$ 468,681	$ 542,027	$ 367,619	$ 273,619	$ 163,619
Expenses	$ 308,663	$ 710,675	$ 384,585	$ 219,785	$ 174,407	$ 210,000	$ 210,000	$ 417,000
Revenues	$ -	$ 1,164,277	$ 11,222	$ 293,131	$ -	$ 16,000	$ -	$ 672,987
Cash from Investments	$ -	$ -	$ 251,444	$ -	$ -	$ 100,000	$ 100,000	$ -
Cash Checking end	**$ 136,998**	**$ 590,600**	**$ 468,681**	**$ 542,027**	**$ 367,619**	**$ 273,619**	**$ 163,619**	**$ 419,606**
Expense Detail								
					Claims list			
Typical Monthly Budget (not including large capital projects - Alum & Sutton Lake)	$ 105,663	$ 154,804	$ 112,833	$ 181,245	$ 167,911	$ 170,000	$ 170,000	$ 170,000
PLOC expenses	$ 3,000	$ 10,005	$ 8,819	$ 20,786	$ 6,496	$ 40,000	$ 40,000	$ 40,000
Alum Spring	$ 200,000		$ 262,319	$ 14,152	$ -			
Alum Upper Prior		$ 542,375		$ -	$ -			
Sutton Lake		$ 3,491	$ 614	$ 3,602	$ -			$ 207,000
Total Expenses	$ 308,663	$ 710,675	$ 384,585	$ 219,785	$ 174,407	$ 210,000	$ 210,000	$ 417,000
Revenue Detail								
Levy		$ 922,861	$ -	$ 36,313				$ 672,987
Misc/Other		$ 12,673	$ 956	$ -				
BWSR Alum Grant		$ 224,750	$ -	$ 224,750				
Sutton Lake Grant		$ -	$ -	$ -				
Grants - Other		$ 2,000	$ 10,266	$ 32,068		$ 16,000		
FEMA		$ 1,994	$ -	$ -				$ -
Total Revenue	$ -	$ 1,164,277	$ 11,222	$ 293,131	$ -	$ 16,000	$ -	$ 672,987
Monthly Northland Investments								
Starting balance	$ 629,670	$ 630,060	$ 629,767	$ 378,188	$ 377,909	$ 378,209	$ 278,509	$ 178,809
Additions	$ 390	$ (293)	$ (135)	$ (279)	$ 300	$ 300	$ 300	$ 200
Reductions	$ -	$ -	$ (251,444)	$ -	$ -	$ (100,000)	$ (100,000)	$ -
Northland account end	$ 630,060	$ 629,767	$ 378,188	$ 377,909	$ 378,209	$ 278,509	$ 178,809	$ 179,009

Notes:

Levy revenue assumptions:	June	actual collection
	December	75%
FEMA Reimbursement assumption:	December	2020
2020 Levy amount		1,794,632